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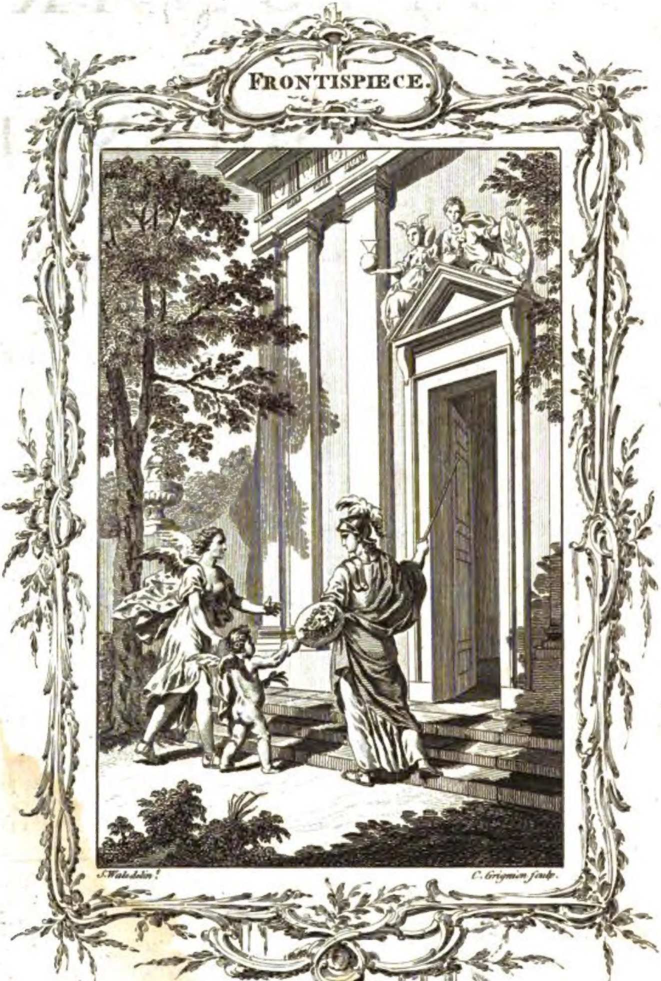
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Genius conducting Taste to the Temple of
ARTS & SCIENCES.

THE COMPLETE
DICTIONARY
OF
ARTS and SCIENCES.

IN WHICH THE WHOLE CIRCLE OF
HUMAN LEARNING
IS EXPLAINED,

And the DIFFICULTIES attending the Acquiſition of EVERY ART,
Whether LIBERAL or MECHANICAL, are Removed,
IN THE MOST EASY AND FAMILIAR MANNER.

Among the various Branches of LITERATURE explained in this WORK are the following, viz.

AGRICULTURE
ALGEBRA
ANATOMY
ARCHITECTURE
ARITHMETIC
ASTRONOMY
BOTANY
CATOPTRICS
CHEMISTRY
CHRONOLOGY
COMMERCE
CONICS
COSMOGRAPHY
DIALLING
DIOPTRICS
ETHICS
FLUXIONS
FORTIFICATION
GARDENING
GAUGING
GEOGRAPHY
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GRAMMAR
GUNNERY
HANDICRAFTS
HERALDRY
HISTORY
HORSEMANSHIP
HUSBANDRY
HYDRAULICS
HYDROGRAPHY
HYDROSTATICS
LAW
LEVELLING
LOGIC
MARITIME AND
MILITARY AFFAIRS
MATHEMATICS
MECHANICS
MERCHANDIZE
METAPHYSICS
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The THEOLOGICAL, PHILOLOGICAL, and CRITICAL BRANCHES, by
The Rev. TEMPLE HENRY CROKER, A. M.
Chaplain to the Right Honourable the Earl of HILLSBOROUGH.
The MEDICINAL, ANATOMICAL, and CHEMICAL,
By THOMAS WILLIAMS, M. D.
The MATHEMATICAL
By SAMUEL CLARK,
Author of an Eaſy Introduction to the Theory and Practice of Mechanics.
AND THE OTHER PARTS BY
Several GENTLEMEN particularly converſant in the Arts or Sciences they have undertaken to explain.

LONDON: Printed for the AUTHORS,
And Sold by J. WILSON & J. FELL, Pater-noſter Row; J. FLETCHER & Co. St. Paul's Church-yard;
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MDCCLXVI.

ADVERTISEMENT.

THE various Improvements lately made in almoſt every Branch of Learning will, we preſume, be a ſufficient Reaſon for compiling a *New Dictionary of Arts and Sciences*; in which we propoſe to preſent the Reader with a complete *Body of Literature*, enriched with all the Diſcoveries of the Learned in Europe.

It ſhould alſo be remembered, that ſince the publication of any Work of this Kind, the *Society for the Encouragement of Arts, Manufactures, and Commerce*, has been inſtituted; and in conſequence of the large Premiums and Bounties given by that generous Body, a great number of Improvements in ſeveral uſeful Arts have been made, and many curious Machines conſtructed, Models of which are now depoſited in the Cuſtody of the Society, for the Benefit of Mankind. We therefore propoſe to give, in the Courſe of this Work, elegant Deſigns and accurate Deſcriptions of the moſt uſeful of theſe Machines, and which, we humbly hope, will be conſidered as a very uſeful Part of our Undertaking.

We are therefore perſuaded that the different Dictionaries already extant, will be no Objection to the Work now offered to the Public; eſpecially as their Imperfections are ſufficiently known in the Republic of Letters. It is not, however, our Intention to depreciate the Works of others in order to recommend our own; but we will venture to promiſe, that every thing valuable in Mr. Chambers' Cyclopedia, and the other Works of that Kind, particularly the Encyclopedie publiſhed at Paris, ſhall be contained in this Dictionary, augmented with the Diſcoveries and Improvements made ſince theſe Works were compiled. At the ſame time we would beg Leave to declare, that theſe Books are ſo far from being the only ones uſed in compoſing this new Dictionary of Arts and Sciences, that we have extracted the greater Part of our Articles from Original Authors; being ſenſible that the Authority of any Work of this Kind muſt, in a great meaſure, depend upon the Reputation and Merit of the Writers from whom it is collected: And our Readers may be aſſured, that in ſuch Articles as are extracted from Foreign Authors, all the Difficulties and Obſcurities that occur in the Original will be removed and explained in their reſpective Tranſlations.

We ſhall alſo endeavour, as far as the Nature of our Plan will admit, to give entire Syſtems of the moſt uſeful Branches of Mathematical Learning, in order to render this Work as independent of others as poſſible; and at the ſame Time to inveſtigate carefully the more ſublime Parts of that Science, ſuch as the Aberration of Light, the Lunar Theory, &c. according to the lateſt Improvements.

Daily Experience ſufficiently demonſtrates how difficult it is for any Author to explain fundamentally a ſingle Art or Science, even when it has been the principal ſtudy of his Life; how great then muſt the Difficulty prove to explain the whole Circle of Arts and Sciences? We were ſufficiently aware of this enormous Burden, and therefore thought proper to divide it, that we might be the better enabled to ſupport ſo great a Weight. Accordingly a ſufficient Number of Gentlemen are engaged in the preſent Undertaking, and each Member employed in executing the Part he thoroughly underſtands; and conſequently is not only acquainted with what the Ancients and Moderns have written on the ſame Subject, but capable of adding to theirs his own Acquiſitions. By this Means the principal Articles will be treated with more Method and more Certainty; carried to a greater Extent, and executed with greater Preciſion, than thoſe of any other Work in the Engliſh Language. It ſhall be our principal Concern to collect Facts, compare Experiments, confute Errors, aſcertain Diſcoveries, and contrive Methods for exciting Perſons of Genius to ſtrike out new Paths of Science, and extend the preſent Boundaries of human Knowledge.

For this purpoſe we ſhall prefix to the Principles of the Liberal Arts a ſuccinct Account of their Riſe and Progreſs, that Perſons of Capacity may have no Reaſon for the future to miſemploy their Time in ſearching after Things already known; nor Pretenders to Science be any longer capable of impoſing on the World, as Diſcoveries of their own, what the Induſtry of others had before explored.

But the greateſt Difficulty attending the preſent Undertaking occurs in the Part relating to the Mechanic Arts. Books afford very little Aſſiſtance here; we have been therefore obliged to have recourſe to Workmen themſelves; who being often incapable of deſcribing with Preciſion the Arts they profeſs, it became neceſſary for us to clear up and methodize their Thoughts; learn the proper Terms of their Art; define them; and deſcribe the various Inſtruments and Machines uſed in their reſpective Occupations.

This has rendered it neceſſary to augment the Number of Plates, as the bare View of an Object often conveys more Information than whole Pages of Words. And though we have taken the greateſt Care to inſert no Figures but what were abſolutely neceſſary, we could not contain the Whole in leſs than ONE HUNDRED AND FIFTY COPPER-PLATES. How imperfect then muſt a Work of this Nature be which has only Thirty!

From this ſhort Sketch the Reader will be able to form ſome Idea of the preſent Undertaking; and we would humbly hope, that its Utility will recommend it to the Favour of the Public. But whatever Fate may attend our Labours, we ſhall always enjoy the inward Satisfaction of having ſpared no Pains to render this Work a *Complete Syſtem of Human Learning*.

We ſhall only add, that as Care will be taken to render the Work complete of itſelf, no *Supplement* will be neceſſary. And we need not point out the Trouble and Inconvenience of a double Alphabet, with which almoſt every Work of this Kind hitherto extant is incumbered.

THE COMPLETE

DICTIONARY

OF

ARTS and SCIENCES.

A, The character of the firſt letter of the alphabet in Latin, Engliſh, French, and moſt of the preſent languages of Europe. The firſt character in the Hebrew alphabet is called *aleph*, in the Greek *alpha*, in the Arabic *eleph*, and in the Syriac *oleph*.

A has deſervedly the firſt place in the alphabet on account of its ſimplicity, very little more being neceſſary to its pronunciation than opening the mouth. As a vowel it has in Engliſh a threefold ſound: ſhort, as in *hat*, *bat*, *&c.* like the Hebrew *pathahh:* long, as in *dâte*, *fâte*, *&c.* and obſcure, as in *call*, *fall*, *&c.* where we hear the ſame ſound as in *olive*, *hollow*, *&c.* except its being long in the former, conformable to the Hebrew *kametz*, and ſhort in the latter, agreeable to *chateph kametz*.

A, among the ancients was a numeral letter, and ſignified 500; and when a daſh was added on the top, Ā, 5000.

A, in the Julian calendar, is the firſt of the dominical letters. It was alſo of uſe in the Roman comitia, or aſſemblies, for making laws, when the people had two tables given them: on the one were the two letters U. R. *uti rogas*, implying their aſſent; becauſe a motion for a new law was called *rogatio:* on the other the letter A, *antiquo*, or *antiquam volo*, to ſignify their diſſent. In capital caſes alſo they had two tables covered with wax, on one of which was the letter A, for *abſolvo*; and on the other C, for *condemno:* whence the former is called by Cicero *ſalutaris*, and the latter *triſtis*.

A, on ancient inſcriptions found on monuments and coins, has various ſignifications, as *Auguſtus*, *Ager*, *Aint*; and ſometimes its meaning can only be known by the reſt of the inſcription. Iſidorus obſerves, that the letter *a*, after the word *miles*, ſignifies that the ſoldier was a young man.

A is alſo an abbreviation, and often found in modern writers; as A. D. for *anno domini*, A. M. *artium magiſter*, maſter of arts, &c. Among logicians it is uſed to denote an univerſal affirmative propoſition.

A. A. A. among chemiſts, ſignifies an amalgama, or the operation of amalgamation.

A, ā, or āā, is uſed by phyſicians as an abbreviation of *ana*, and ſignifies an equal quantity of the ingredients that immediately precede it in the preſcription.

AABAM, a term uſed by ſome alchemiſts to ſignify lead.

AAM, a meaſure of capacity for liquids uſed at Amſterdam, containing about ſixty-three pounds, averdupois weight.

AB, the eleventh month of the civil year of the Hebrews, and the fifth of their eccleſiaſtical year, which begins with the month Niſan. It anſwers to the moon of July; that is, to part of our month of the ſame name, and to the beginning of Auguſt; it conſiſts of thirty days. The Jews faſt on the firſt of this month, in memory of Aaron's death; and on the ninth, becauſe on that day both the temple of Solomon, and that erected after the captivity, were burnt; the former by the Chaldeans, and the latter by the Romans. The ſame day is alſo remarkable among that people for the publication of Adrian's edict, wherein they were forbid to continue in Judea, or even to look back when at a diſtance from Jeruſalem, in order to lament the deſolation of that city. The eighteenth of the ſame month is alſo a faſt among the Jews; becauſe the lamp in the ſanctuary was that night extinguiſhed, in the time of Ahaz.

AB, in the Syriac calendar, is the name of the laſt ſummer month. The firſt day of this month they called *Saum-Miriam*, the faſt of the virgin, becauſe the eaſtern chriſtians faſted from that day to the fifteenth, which was therefore called *Fathr-Miriam*, the ceſſation of the faſt of the virgin. *D'Herbelot Bib. Orient.*

The vulgar year of the eaſtern Arabians, Perſians, and Turks, being purely lunar, they are obliged, in their aſtronomical calculations, to deviate from the common method of computing time, and have recourſe to the ſolar year, borrowing the names of the months from the Syriac calendar, which they call Rumi, or Greek; becauſe it was formerly peculiar to the Greeks of Syria, whom chronologiſts term Syro-Macedonians.

ABACO, among ancient writers, ſignifies arithmetic: the Italians ſtill uſe it to imply that ſcience.

ABACOT, the name of an ancient cap of ſtate, worn by the kings of England: the ſuperior part of it formed a double crown.

ABACTORS, or Abactores, a name given to thoſe who drive away, or rather ſteal cattle by herds, or great numbers at once; and are therefore very properly diſtinguiſhed from *fures*, or thieves. *Cunningham's Law Dict.*

The word is derived from *abigo*, compounded of *ab*, from, or away; and *ago*, to drive.

ABACUS, among the ancients, was a kind of buffet, or cupboard.

It is derived from the Greek, αβαξ, a table.

Abacus, in architecture, is the ſuperior member of the capital, to which it ſerves as a kind of crown. It was originally intended to repreſent a ſquare tile laid over a baſket, an accident which Vitruvius tells us gave occaſion to Callimachus, an ingenious ſtatuary of Athens, to invent the firſt regular order of architecture. See Capital.

The abacus ſtill retains its original form in the Tuſcan, Doric, and Ionic orders; but in the Corinthian and Compoſite, its four ſides or faces are arched inwards, having ſome ornament, as a roſe, or other flower, in the middle.

Abacus is alſo uſed by Scamozzi for a concave moulding on the capital of the Tuſcan pedeſtal. And Andrea Palladio calls the plinth above the echinus, or boultin in the Tuſcan and Doric orders, by the ſame name.

Abacus, among the ancient mathematicians, ſignified a table covered with duſt, on which they drew their diagrams; the word in this ſenſe being derived from the Phœnician *abak*, duſt.

Abacus *Pythagoricus*, the common multiplication table; ſo called from its being invented by Pythagoras.

ABADDON, a name given by St. John in the Revelations, to the king of Locuſts. It is derived from *abad*, to deſtroy.

ABADIR, a word compoſed of two Phœnician terms, ſignifying magnificent father, a title which the Carthaginians gave to gods of the firſt order. In mythology it is the name of a ſtone which Saturn ſwallowed, from a perſuaſion that it was his infant ſon Jupiter.

ABAFT, in the ſea language, ſignifies towards the ſtern. Thus, when any thing is ſaid to be abaft the mizzen-maſt, it implies that the object is between the mizzen-maſt and the ſtern.

ABAPTISTON, in ſurgery, ſignifies the perforating part of the trepan; becauſe it is prevented from ſinking ſuddenly into the ſkull and wounding the brain.

It is derived from α, priv. and βαπτω, to ſink under.

ABARTICULATION, in anatomy, a particular kind of articulation, called diarthroſis. See Diarthrosis.

ABAS, a weight uſed by the Perſian merchants in weighing pearls. It is one eighth leſs than the European caratt.

ABASED, *abaſſe*, in heraldry, is applied to the wings of eagles, &c. when the extremity points downwards to the point of the ſhield, or when the wings are ſhut; the natural way of bearing them being extended.

ABATAMENTUM, in law, is an entry into lands by interpoſition; that is, when a perſon dies ſeized, and another, who has no right, enters before the heir. *Cunningham's Law Dict.*

To ABATE, (from the French *abbatre*, to pull down, overthrow, demoliſh, batter down, or deſtroy) a term uſed by the writers of the common law, both in an active and neutral ſenſe; as to abate a caſtle, is to beat it down. To abate a writ is, by ſome exception, to defeat or overthrow it. A ſtranger abateth; that is, entereth upon a houſe or land void by the death of him that laſt poſſeſſed it, before the heir takes poſſeſſion, and ſo keepeth him out; wherefore, as he that putteth out him in poſſeſſion is ſaid to diſſeize; ſo he that ſteppeth in between the former poſſeſſor and his heir, is ſaid to abate. In the neuter ſignification thus: the writ of the demandant ſhall abate; that is, ſhall be diſabled, fruſtrated, or overthrown. The appeal abateth by covin; that is, the accuſation is defeated by deceit. *Cunningham's Law Dict.*

To Abate, in the manege, implies the performing any downward motion properly. Thus a horſe is ſaid to abate or take down his curvets, when he puts both his hind legs to the ground at once, and obſerves the ſame exactneſs in all the times.

ABATEMENT, in heraldry, implies ſomething added to a coat of arms, in order to leſſen its true dignity, and point out ſome imperfection, or ſtain, in the character of the wearer.

Abatement, in law. See To Abate.

ABATOR, in law, is a perſon who enters a houſe or lands, void by the death of the laſt poſſeſſor, before the true heir.

ABB, in the woollen manufacture, implies the yarn of a weaver's warp.

ABBESS, the ſuperior of an abbey, or convent of nuns, over whom ſhe enjoys the ſame privileges as the abbots over their monks. Her ſex does not indeed allow an abbeſs to perform the ſpiritual functions annexed to the prieſthood; but there are inſtances of ſome abbeſſes who have the privilege of commiſſioning a prieſt to act for them.

ABBEY, a religious houſe, or place, where perſons retire from the world to ſpend their time in ſolitude and devotion.

The wonderful eſteem ſuch men formerly acquired, procured them very large privileges, exemptions, and riches, which they drew from the people by the invention of maſſes for the living and the dead, diſpenſations, jubilees, indulgencies, &c.

Theſe religious houſes were totally aboliſhed in England by Henry VIII. who, in the twenty-eighth year of his reign, appointed viſitors to inſpect the abbeys, and examine into the behaviour of the monks; who, being convicted of having ſpirited up rebellions againſt the government, and committing many other diſorders, and perceiving the time of their diſſolution drawing near, were prevailed upon to reſign their houſes to the king; by which means the abbey-lands became veſted in the king, which were afterwards granted to the people, under which grants they are enjoyed to this day. There were one hundred and ninety ſuch religious houſes diſſolved, whoſe yearly revenues amounted to near 2853000 l.

ABBOT, or Abbat, the ſuperior of an abbey or convent of monks.

The word is derived from the Syriac, *abba*, father.

In the firſt ages of chriſtianity the abbots were men of great plainneſs and ſimplicity, contented with the government of their own monaſteries, which were erected in the moſt ſolitary parts, without pretending to any ſhare in eccleſiaſtical affairs. But being called from theſe obſcure retreats to oppoſe the hereſies which too ſoon appeared in the church, they became ambitious of power, and endeavoured to render themſelves independent of the biſhops. It was however ſome time before they could carry their point of independency; but, having ſucceeded in that attempt, they ſoon obtained the title of lord, together with other badges of epiſcopal authority, particularly the mitre. Hence aroſe new ſpecies of diſtinctions between the abbots; thoſe were termed mitred abbots, who were privileged to wear the mitre, and exerciſe epiſcopal authority within their reſpective precincts. Others were called croſiered abbots, from their bearing the croſier, or paſtoral ſtaff. Others were ſtiled œcumenical, or univerſal abbots, in imitation of the patriarch of Conſtantinople: while others were termed cardinal abbots, from their ſuperiority over all other abbots.

At preſent the principal diſtinctions obſerved between abbots, are thoſe of regular and commendatory. The former take the vow and wear the habit of the order; whereas the latter are ſeculars, though they are obliged by their bulls to take orders when of proper age.

Before the Reformation in England, there were elective and preſentative abbots: ſome who were mitred, and ſome who were not. Such as were mitred had epiſcopal authority within their limits, being exempted from the juriſdiction of the biſhop; while the others were ſubject to the dioceſan in all ſpiritual government. The mitred abbots were lords of parliament, and called abbots ſovereign, and abbots general, to diſtinguiſh them from the other abbots. And as there were lords abbots, ſo there were alſo lords priors, who had exempt juriſdiction, and were likewiſe lords of parliament. Some reckon twenty-ſix of theſe lords, abbots, and priors, that ſat in parliament. Sir Edward Coke ſays, that there were twenty-ſeven parliamentary abbots, and two priors. In the parliament 20 R. II. there were but twenty-five abbots, and two priors: but in the ſummons to parliament, *Anno* 4 Ed. III. more are named.

ABBREVIATURE, or ABBREVIATION, implies the ſubſtitution of a ſyllable, letter, or character, for a whole word.

The word is derived from *abbrevio*, to ſhorten.

ABBREVOIR, in maſonry, ſignifies certain indentures made in the joints or beds of ſtones, that the mortar or cement may, by filling theſe cavities, bind the work the firmer together.

ABBUTTALS, or ABUTTALS, (from the French *aboutir*, to border upon) the buttings and boundings of land, either to the eaſt, weſt, north, or ſouth, ſhewing on whatever lands, rivers, highways, or other places it abbuts.

Cambden ſays, that limits were diſtinguiſhed by hillocks raiſed on purpoſe, which were called botentines; whence we have the word butting. In a terrier, or deſcription of the ſite of land, the ſides on the breadth are properly adjacentes, lying or bordering, and the ends only in length are abuttantes, abutting or bounding: which, in old ſurveys, they ſometimes expreſſed by capitare, to head; whence abuttals are now called head-lands. *Cunningham's Law Dictionary.*

ABCEDARY, or ABCEDARIAN, an epithet applied to compoſitions whoſe parts are diſpoſed in alphabetical order.

ABDEST, a Perſian word, properly ſignifying the water placed in a baſon for waſhing the hands; but is uſed to imply the legal purifications in uſe among the Mahometans, before they enter on their religious ceremonies.

ABDICATION, the action where a magiſtrate, or perſon in office, renounces and gives up the ſame, before the term of ſervice is expired.

This word is frequently confounded with reſignation, but differs from it in that abdication is done purely and ſimply; whereas reſignation is in favour of ſome third perſon. It is ſaid to be a renunciation, quitting and relinquiſhing, ſo as to have nothing further to do with a thing; or the doing of ſuch actions as are inconſiſtent with the holding of it. On king James's leaving the kingdom, and abdicating the government, the lords would have the word deſertion made uſe of; but the commons thought it was not comprehenſive enough; for that the king might then have liberty of returning. *Cunningham's Law Dict.*

ABDOMEN, in anatomy, that part of the human body intercepted between the thorax and the pelvis.

The word is Latin, and derived from *abdo*, to hide.

Anatomiſts have generally divided the body into three great cavities, which they call bellies: the head, or the upper belly; the thorax, or the middle belly; and the abdomen, or lower belly. The Arabians, and ſome writers in the barbarous ages, called the abdomen, or at leaſt the external part of it, mirach; and the peritonæum, ſiphac.

The abdomen, ſays the accurate Winſlow, begins immediately under the thorax, and terminates at the bottom of the pelvis of the oſſa innominata. Its circumference, or outer ſurface, is divided into regions, of which there are three anterior, viz. the epigaſtric, or ſuperior region; the umbilical, or middle region; and the hypogaſtric, or lower region. There is but one poſterior region, named regio lumbaris.

The epigaſtric region begins immediately under the appendix enſiformis, at a ſmall ſuperficial depreſſion, called the pit of the ſtomach, and in adult ſubjects ends above the navel, at a tranſverſe line, ſuppoſed to be drawn between the laſt falſe ribs on each ſide.

This region is ſubdivided into three parts, one middle, named epigaſtrium; and two lateral, termed hypochondria. The epigaſtrium takes in all that ſpace which lies between the falſe ribs of both ſides; and the hypochondria are the places covered by the falſe ribs.

The umbilical region begins in adults, above the navel, at the tranſverſe line already mentioned, and ends below the navel at another tranſverſe line, ſuppoſed to be drawn parallel to the former, between the two criſtæ of the oſſa ilium.

This region is likewiſe divided into three parts; one middle, which is properly the regio umbilicalis; and two lateral, called ilia, or the flanks, and they comprehend the ſpace between the falſe ribs and the upper part of the os ilium on each ſide.

The hypogaſtric region is extended downward from the inferior limit of the umbilical region, and is divided into three parts, one middle, called pubes; and two lateral, called inguina, or the groins.

The lumbar region is the poſterior part of the abdomen, and comprehends all that ſpace which reaches from the loweſt ribs on each ſide, and the laſt vertebra of the back, to the os ſacrum, and neighbouring parts of the oſſa ilium. The lateral parts of this region are termed the loins; but the middle part has no proper name in men.

Laſtly, the bottom of the abdomen, which anſwers to the pelvis of the ſkeleton, is terminated anteriorly by the clunes, or buttocks, and anus. The buttocks are ſeparated by a foſſa, which leads to the anus, and each buttock is terminated downward by a large fold, which diſtinguiſhes it from the reſt of the thigh.

This lumbar region takes in likewiſe the muſculus quadratus lumborum on each ſide, the lower portions of the ſacrolumbares of the longiſſimi and latiſſimi dorſi, the muſculus ſacer, &c.

The ſpace between the anus and the parts of generation is called perinæum, and is divided into equal lateral parts by a diſtinct line, which is longer in males than in females.

The cavity of the abdomen, formed by the parts already mentioned, (all which are covered by the ſkin and membrana adipoſa) is lined on the inſide by a particular membrane, called peritonæum. It is ſeparated from the cavity of the thorax by the diaphragm, and terminated below by the muſculi levatores ani.

This cavity contains the ſtomach, and the inteſtines, which are commonly divided into three ſmall, named duodenum, jejunum, and ilium; and three large, called cœcum, colon, and rectum. It contains likewiſe the meſentery, meſocolon, omentum, liver, gall-bladder, ſpleen, pancreas, glands of the meſentery, vaſa lactea, receptaculum chyli, kidneys, renal glands, ureters, bladder, and the internal parts of generation in both ſexes. *Winſlow's Anat.*

ABDUCTION, in logic, a particular form of reaſoning, called by the Greeks *απαγωγη*, wherein we infer from a certain or undeniable propoſition, the truth of ſomething ſuppoſed to be contained in that propoſition.—The following ſyllogiſm is of this kind:

> Whatever God has revealed is undoubtedly true:
> But God has revealed the myſtery of the Trinity:
> Therefore that myſtery is undoubtedly true.

The major of the above ſyllogiſm is certain; but it remains to be proved that the minor, or aſſumption, is contained in the major.

ABDUCTION, in ſurgery, is that ſpecies of fracture, when a bone near the joint is divided tranſverſely in ſuch a manner, that the extremities of the fractured bone recede from each other.

ABDUCTOR is a name given by anatomiſts to the following muſcles:

ABDUCTOR *Minimi Digiti Manus*, or *Abductor Auricularis*, ariſes fleſhy from the thin protuberating part of the eighth bone of the wriſt; is inſerted by a pretty long and round tendon, on the inſide of the ſhort tendon of the above deſcribed muſcle, near the upper part of the firſt bone of the little finger. It ſerves not only to abduce the little finger from the reſt, but alſo to bend it a little.

ABDUCTOR *Indicis*, ariſes broad and fleſhy from the ſuperior part of the firſt bone of the thumb; is inſerted by a ſhort tendon into the upper part of the firſt bone of the fore-finger, laterally, next the thumb. Its uſe is to bring the index towards the thumb, by drawing it from the middle finger.

ABDUCTOR *Minimi Digiti Pedis*, ariſes fleſhy and tendinous from the ſemicircular edge of a cavity, on the outſide of the inferior protuberance of the os calcis; it has another tendinous beginning from the os cuboides, and a third from the upper part of the os metatarſi minimi digiti; is inſerted into the upper part of the firſt bone of the little-toe externally and laterally. Its uſe is to draw the little-toe outwards from that next to it.

ABDUCTOR *Oculi*, ariſes tendinous and fleſhy from the foramen lacerum, without the orbit; is inſerted by a thin tendon into the ſclerotis, where it reſpects the great canthus. Its uſe is to move the eye outwards, from the great to the little angle.

ABDUCTOR *Pollicis Manus*, or *Thenar*, ariſes by a broad tendinous and fleſhy beginning from the tranſverſe ligament of the carpus, and from one of its bones that articulates with the thumb; is inſerted tendinous into the ſecond joint of digitorum manus. Its uſe is to draw the thumb from the fingers.

ABDUCTOR *Pollicis Pedis*, ariſes fleſhy from the inſide of the lower protuberance of the os calcis laterally, and tendinous from a little tubercle in the ſame bone, near the os cymbiforme. It only adheres to the other bones on the inſide of the foot, filling up the hollowneſs in the os metatarſi pollicis; is inſerted into the internal os ſeſamoideum of the firſt bone of the great toe; its tendons being farther continued upon the ſame bone laterally. Its uſe is to pull the great-toe from the reſt.

ABDUCTOR *Femoris Primus*, ariſes by a ſtrong roundiſh tendon from the upper part of the os pubis next the pectinæus above the gracilis; which, turning into a compact fleſhy belly, it begins to be inſerted tendinous about the middle of the linea aſpera, being continued down upon the ſame five or ſix inches, ſending out a tendon which joins with that of the femoris quartus.

ABDUCTOR *Femoris Secundus*, ariſes from the os pubis, immediately under the gracilis, by a broad tendinous, but chiefly fleſhy beginning; and is inſerted into the linea aſpera, from a little below the leſſer trochanter, to the firſt inſertion of the laſt deſcribed muſcle.

ABDUCTOR *Femoris Tertius*, ariſes lower down than the former, from the outer edge of the os pubis and iſchium; and, running obliquely towards the trochanter minor, is inſerted near the glutæus maximus.

ABDUCTOR *Femoris Quartus*, ariſes from the protuberance of the iſchium, and the adjoining interior part of that bone, by a tendinous and fleſhy origination; is inſerted by a round and long tendon, into the upper and rough part of the inner and lower appendix of the os femoris, being affixed to that bone a little above the condyle; as alſo to ſome part of the linea aſpera.

The uſe of all theſe four muſcles is to adduce or move the thigh bone inwards, according to their different directions. *Douglaſs on the Muſcles.*

ABELIANS, a ſect of heretics that ſprung up during the reign of Arcadius, near Hippo in Africa. Their diſtinguiſhing tenet was to marry, and yet to live with their wives without having any carnal commerce with them.

ABERRATION *of the Stars*, a ſmall apparent motion of the fixed ſtars diſcovered by the late Dr. Bradley.

The word is Latin, and compounded of *ab*, from, and *erro*, to wander, becauſe the ſtars appear to wander from their true ſituation.

This noble diſcovery was made by accident in the year 1725, when Mr. Molyneux and Dr. Bradley began to obſerve the bright ſtar in the head of *Draco*, marked γ by Bayer, as it paſſed near the zenith, with an inſtrument made by Mr. Graham, in order to diſcover the parallax of the earth's annual orbit, and after repeated obſervations they found this ſtar, about the beginning of March 1726, to be 20″ more ſoutherly than at the time of the firſt obſervation. It now indeed ſeemed to have arrived at its utmoſt limit ſouthward; becauſe, in ſeveral trials made about this time, no ſenſible difference was obſerved in its ſituation. By the middle of April it appeared to be returning back again toward the north, and about the beginning of June it paſſed at the ſame diſtance from the zenith as it had done in December, when it was firſt obſerved; in September following it appeared 39″ more northerly than it was in March, juſt the contrary way to what it ought to appear by the annual parallax of the ſtars.

This unexpected phænomenon perplexed the obſervers very much; and Mr. Molyneux died before the true cauſe of it was diſcovered. After this, Dr. Bradley, with another inſtrument more exact and accurately adapted to this purpoſe, obſerved the ſame appearances not only in that but in many other ſtars: and, by the great regularity that appeared in a ſeries of obſervations made in all parts of the year, the doctor was fully ſatisfied with regard to the general laws of the phænomena; and therefore endeavoured to find out the cauſe of them. He was already convinced that the apparent motion of the ſtars was not owing to a nutation of the earth's axis. The next thing that offered itſelf, was an alteration in the direction of the plumb line, with which the inſtrument was conſtantly rectified; but this, upon trial, proved inſufficient. Then he had recourſe to what refraction might do, but here alſo nothing ſatisfactory occurred. At laſt, through a moſt amazing ſagacity, this acute aſtronomer conjectured, that all the phænomena, hitherto mentioned, proceeded from the progreſſive motion of light, and the earth's annual motion in its orbit: for he perceived, that if light was propagated in time, the apparent place of a fixed object would not be the ſame when the eye is at reſt, as when it is moving in any other direction, than that of the line paſſing through the eye and object; and that, when the eye is moving in different directions, the apparent place of the object would be different.

He conſidered this matter in the following manner: he imagined C A (plate I. *fig.* 1.) to be a ray of light, falling perpendicularly upon the line B D; then if the eye is at reſt at A, the object muſt appear in the direction A C, whether light be propagated in time, or in an inſtant. But if the eye is moving from B towards A, and light is propagated in time, with a velocity, that is, to the velocity of the eye, as C A to B A; then light moving from C to A, whilſt the eye moves from B to A, that particle of it, by which the object will be diſcerned when the eye in its motion comes to A, is at C, when the eye is at B. Joining the points B, C, he ſuppoſed the line C B, to be a tube (inclined to the line B D, in the angle D B C) of ſuch a diameter as to admit of but one particle of light; then it was eaſy to conceive that the particle of light at C (by which the object muſt be ſeen when the eye, as it moves along, arrives at A) would paſs through the tube B C, if it were inclined to B D in the angle D B C, and accompanied the eye in its motion from B to A; and that it could not come to the eye placed behind ſuch a tube, if it had any other inclination to the line B D. If, inſtead of ſuppoſing C D ſo ſmall a tube, we imagine it to be the axis of a larger; then, for the ſame reaſon, the particle of light at C cannot paſs through that axis, unleſs it be inclined to B D, in the angle C B D. In like manner, if the eye move the contrary way, from D towards A, with the ſame velocity; then the tube muſt be inclined in the angle B D C. Therefore, although the true or real place of an object is perpendicular to the line in which the eye is moving, yet the viſible place will not be ſo, ſince that muſt doubtleſs be in the direction of the tube; but the difference between the true and apparent place will be, *cæteris paribus*, greater or leſs, according to the different proportion between the velocity of light, and that of the eye. So that if we could ſuppoſe that light was propagated in an inſtant, then there would be no difference between the real and viſible place of an object, although the eye were in motion; for, in that caſe, A C being infinite with reſpect to A B, the angle A C B (the difference between the true and viſible place) vaniſhes. But if light be propagated in time, (which will be readily allowed by moſt of the philoſophers of this age), then it is evident from the foregoing conſiderations, that there will be always a difference between the real and viſible place of an object, unleſs the eye is moving either directly towards or from the object. And in all caſes the ſine of the difference between the real and viſible place of the object, will be to the ſine of the viſible inclination of the object, or the line in which the eye is moving, as the velocity of the eye, to the velocity of light. If light moved but 1000 times faſter than the eye, and an object (ſuppoſed to be at an infinite diſtance) was really

PLATE I.

Facing Aberration.

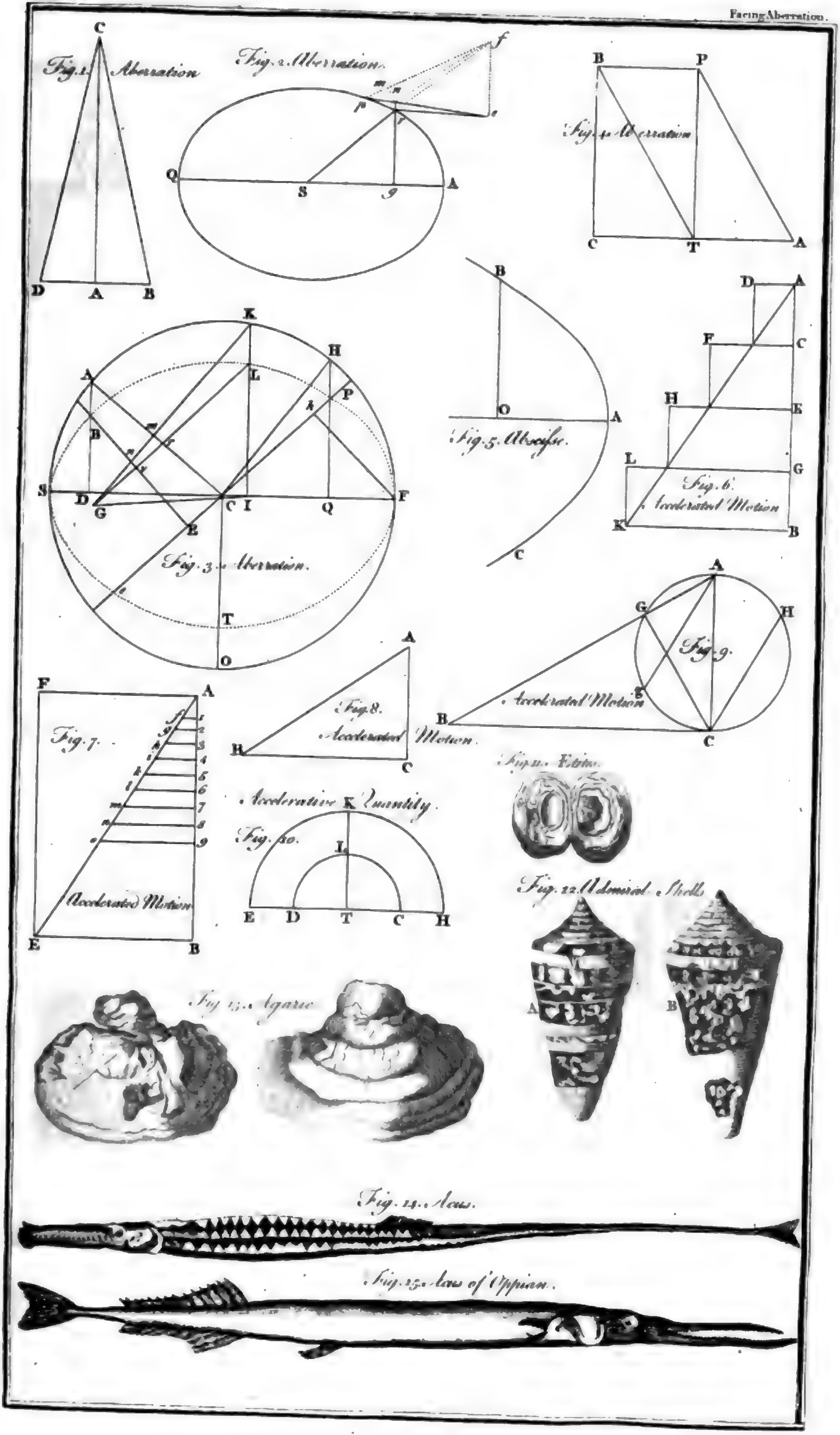


Fig. 1. Aberration
C
D
A
B
Fig. 2. Aberration
f
m
n
p
r
e
Q
S
g
A
Fig. 4. Aberration
B
P
C
T
A
Fig. 3. Aberration
K
H
A
L
P
B
h
m
r
n
s
S
D
G
C
I
Q
F
E
e
T
O
Fig. 5. Abscisse
B
O
A
C
Fig. 6. Accelerated Motion
D
A
F
C
H
E
L
G
K
B
Fig. 9. Accelerated Motion
A
G
H
E
B
C
Fig. 7.
F
A
f
g
h
i
k
l
m
n
o
1
2
3
4
5
6
7
8
9
Accelerated Motion
E
B
Fig. 8. Accelerated Motion
A
B
C
Accelerative Quantity
Fig. 10.
K
L
E
D
T
C
H
Fig. 11. Etites
Fig. 12. Admiral Shells
A
B
Fig. 13. Agaric
Fig. 14. Acus
Fig. 15. Acus of Oppian

placed perpendicularly over the plane in which the eye is moving, it follows from what has been ſaid, that ſuch object's apparent place will be always inclined to that plane, in an angle of 89°, 56′ ½; ſo that it will conſtantly appear 3′ ½ from its true place, and ſeem ſo much leſs inclined to the plane, that way towards which the eye tends; that is, if A C is to A B, or A D, as 1000 to 1, the angle A B C will be 89°, 56′ ½, and A C B = 3′ ½, and B C D = 2 A C B = 7′, if the direction of the eye's motion is at one time contrary to what is at another.

If the earth revolve round the ſun annually, and the velocity of light were to the velocity of the earth's motion in its orbit, (ſuppoſed circular as it nearly is), as 1000 to 1; then it is eaſy to conceive that a ſtar, really placed in the very pole of the ecliptic, would, to an eye carried along with the earth, ſeem to change its place continually, and, neglecting the ſmall difference on account of the earth's diurnal revolution on its axis, would ſeem to deſcribe a circle round that pole, every way diſtant therefrom 3′ ½: ſo that its longitude would be varied through all the points of the ecliptic, every year; but its latitude would always remain the ſame. Its right aſcenſion would alſo change, and its declination according to the different ſituation of the ſun in reſpect of the equinoctial points, and its apparent diſtance from the north pole of the equator, would be 7′ leſs at the autumnal than at the vernal equinox. The greateſt alteration of the place of a ſtar in the pole of the ecliptic (or which in effect amounts to the ſame, the proportion between the velocity of light and the earth's motion in its orbit) being known, it will not be difficult to find what would be the difference upon this account, between the true and apparent place of any other ſtar at any time; and, on the contrary, the difference between the true and apparent place being given, the proportion between the velocity of light and the earth's motion in its orbit may be found.

P R O P O S I T I O N.

Having given from experiment, the ratio of the velocity of light, to that of the earth in its orbit, and the true places of the ſun and ſtar, to find the apparent place of the ſtar from thence ariſing; the earth being here conſidered as moving in an orbit perfectly circular, from which its real orbit does not greatly differ.

Let $A r Q A$ (plate I. *fig.* 2.) be the earth's orbit, conſidered as a circle; S the ſun in the center; r the earth moving about the ſame from A towards Q; $r e$ a line, which being produced ſhall paſs through the ecliptic place of the given ſtar A S parallel and $g r$ perpendicular thereto: let $e f$ be perpendicular to the plane of the ecliptic, ſo that $r f$ being equal to $S r$ or radius, $r e$ may be the coſine of the latitude of the given ſtar: this being premiſed, it is evident that the true place of the ſtar from the earth will be in the direction $r f$, and with reſpect to the ecliptic, in the line $r e$; therefore the angle $S r e$, $(= Q S r)$ being the difference of longitudes of the ſun and ſtar, is given by the queſtion. Let $r g$, the ſine of the ſupplement of this angle, be denoted by b, its coſine $S g$ by c, the ſign of the given latitude or $f e$ by s; and the radius $S r$ or $f r$ by unity; and while a particle of light is moving along $f r$, let the earth be ſuppoſed to be carried in its orbit from r to p, over a diſtance ſignified by r, and $p e$; $p f$ being drawn, make $r n$ and $m n$ perpendicular thereto: then, becauſe of the exceeding ſmallneſs of $p r$, it may be conſidered as a right line, and we ſhall have $1\ (S r) : b\ (r g) :: r\ (p r) : r b\ (= p n)$; and $1 : r :: c : r c\ (= r n)$, by the ſimilarity of the triangles $p r n$, $S r g$; whence as $1\ (f p)$ to $s\ (f e)$ ſo is $r b$, to $r b s = (n m)$ the ſine of the angle $n f m$: but ſince the ſine or the tangent of a very ſmall arch differs inſenſibly from the arch itſelf, theſe values $r c$ and $r b s$ may be taken as the meaſures of the angles $r f n$, and $n f m$: hence we have, as the ſemiperiphery $A r Q$ (= 3 14159, &c.) to 648000 (the ſeconds in 180 degrees) ſo is $r c$ to $\frac{648000\, r c}{3.14159,\text{\&c.}}$ (the number of ſeconds in the angle $r f n$); and as $3.14159,\text{\&c.} : 648000 :: r b s : \frac{648000\, r s b}{3.14159,\text{\&c.}} = n f m$: therefore, as the earth moves from r to p, while a particle of light is deſcribing $f r$, it is manifeſt from what has preceded, that the ſtar will appear removed from the great circle paſſing through its true place, and the pole of the ecliptic by $\frac{648000\, r c}{3.14159,\text{\&c.}}$ ſeconds, and to have its latitude increaſed by $\frac{648000\, r s b}{3.14159,\text{\&c.}}$ ſeconds. Q. E. I.

Corol. I. Hence if C (plate I. *fig.* 3) be the true place of the ſtar, S C F its parallel of latitude, and about C, as a center, the ellipſe F P S T F, and circle F H S O F be deſcribed ſo, that F C may be $= \frac{648000}{3.14159,\text{\&c.}}$ and T C, the ſemiconjugate axis, in proportion thereto as s to 1; and if the angles S C H be taken equal to the difference of longitudes of the ſun and ſtar, then in the point P, where the elliptical periphery is interſected by the right line H Q, falling perpendicularly on F S, the ſtar will appear to be poſited. For as 1 (*radius*) : b (ſine of Q C H) :: $CH : b \times CH = HQ$; but by the relation of the two curves $CH : CT :: b \times CH\ (= HQ) : PQ$; that is, by conſtruction, $1 : s :: \frac{648000\, r}{3.14159,\text{\&c.}} \times b : \frac{648000\, r s b}{3.14159,\text{\&c.}} = PQ$; again, as 1 (*radius*) : c (the coſine of Q C H) $:: \frac{648000\, r}{3.14159,\text{\&c.}} (= CH) : \frac{648000\, r c}{3.14159,\text{\&c.}} = CQ$; which expreſſions are the very ſame with thoſe abovementioned.

Corol. II. Therefore it follows, that while the ſun appears to purſue his courſe through the ecliptic, the ſtar will be ſeen as moving from F towards L and S, and ſo on till it hath deſcribed the whole elliptic periphery F L S T F, that its latitude will be the leaſt at T, and its apparent longitude the greateſt poſſible, when the angle S C H, ſhewing the diſtance of the ſun and ſtar in the ecliptic, is equal to two right ones. It alſo follows, that the greater axes of the ellipſes, which all ſtars appear to deſcribe, are equal, having been finally determined by Dr. Bradley, from a multitude of accurate obſervations, to amount to 40″ of a great circle. The term 20″, which frequently occurs in the following practical rules, is put for one half thereof; as repreſenting the radius of the ſmall circle, which a ſtar, ſuppoſed placed in either of the poles of the ecliptic, would appear annually to deſcribe about ſuch pole as a center. It follows moreover, that the greateſt aberrations, or *maxima*, in longitude, will be as the coſines of the latitude inverſely; and the *maxima* in latitude, as the ſines of the ſame latitudes directly.

Corol. III. Hence may alſo be found, the ſtars apparent right aſcenſion and declination, ; for let E C P be the parallel of the ſtar's declination, P the apparent place of the ſtar, when in that parallel, make C A perpendicular to C H, A B D to S F, and B E to P C, and let H K, or the angle H C K, be any diſtance gone over by the earth in the ecliptic, while the ſtar by its apparent motion moves through the correſponding diſtance P L. Let $K m n G$ be parallel to H C, and $L r v$ to P C: then foraſmuch as K L is parallel to H P, the triangles G K L, C H P, muſt be equiangular; and therefore $GL : CP :: KL : HP$; but K L is to H P, as L I to Q P, by the property of the curve, whence it will be $GL : CP :: LI : QP$; wherefore the ſides G L, I L, C P, Q P, about the equal angles G L I, C P Q, being proportional, the triangles G L I, C P Q muſt be ſimilar, and therefore the angle G I L a right one; and conſequently the right line S F, the locus of the point G. Therefore, as the angles n, m, r, v, are all given, or continue invariable; let the angle S C K, or the ecliptic diſtance of the ſun and ſtar, be what it will, the ratio of $C m$ to C G, will always be given; but the ratio of C G to $C r$ is given: therefore the ratio of $C m$ to $C r$ is likewiſe given: hence becauſe $r v$ is parallel to C E, the ratio of $C m$ to $E v$ will be given. But $E v$ is the difference of the true and apparent declinations; and $C m$ is as the ſine of the angle H C K; whence it is manifeſt, that the aberration of declination, at any time, is as the ſine of the ſun's elongation from either of the true points wherein he is, when the true and apparent declinations are the ſame; and therefore $C m$ will be to $E v$, or A C to E B, the greateſt aberration, as Q H to $F h$; that is, as the ſine of H C F to the ſine of P C Q; but P C Q being equal to the angle of poſition, is given, whoſe tangent it is obvious is to the tangent of H C F, as Q P to Q H, or as C T to C O; or laſtly, (by conſtruction) as the ſine of the ſtar's latitude to radius: hence, by having the angle H C F, which is now given, we may, by help of the foregoing theorem or propoſition, find the aberration of declination at any time, and in any caſe propoſed.

In like manner, other propoſitions may be derived for finding the aberration in right aſcenſion, it being eaſy to prove that it will be as the ſine of the ſun's elongation from where he is, when the true and apparent right aſcenſions are the ſame; but the method of demonſtrating being the ſame, it will be needleſs to repeat it.

PRACTICAL RULES

For finding the aberration of the fixed ſtars in longitude, latitude, declination, and right aſcenſion.

Let A repreſent the aberration at any given time; M the greateſt aberration, or maximum; ⊙, the ſun's place in the ecliptic, when the ſtar's apparent longitude, latitude, declination or right aſcenſion, being the ſame as the true, tends to exceſs; P, the ſtar's angle of poſition; Z, the ſun's elongation from its neareſt ſyzygy with the ſtar at the time of ⊙.

For the aberration in longitude.

⊙ is always three ſigns after the ſtar's true place in the ecliptic.

Prob. 1. To find M.

Coſine ſtar's latit. : rad. :: 20″ : M.

Prob. 2. To find A.

Rad. : ſine ſun's elongat. from ⊙ :: M : A.

Otherwiſe without M.

Coſin. ſtar's latit. : ſin. ſun's elongat. from ⊙ :: 20″ : A.

For the aberration in latitude.

⊙ is always at the ſtar's oppoſition to the ſun.

Prob. 1. To find M.

Rad. : ſin. ſtar's latit. :: 20″ : M.

Prob. 2. To find A.

Rad. : ſin. ſun's elongat. from ⊙ :: M : A.

Otherwiſe, without M.

Rad. : ſin. ſtar's latit. × ſin. ſun's elongat. from ⊙ :: 20″ : A.

Otherwiſe,

Coſec. ſtar's latit. : ſin. ſun's elongat. from ⊙ :: 20″ : A.

For the aberration in declination.

Prob. 1. To find ⊙.

Sin. ſtar's latit. : rad. :: tang. P : tang. Z.

Then if the ſtar (in reſpect of that pole of the equator which is of the ſame denomination as the ſtar's latitude) be in a ſign

1. Aſcending, and P be acute, Z taken from the oppoſite to its true place, gives ⊙.
2. Aſcending, and P be obtuſe, Z added to its true place, gives ⊙.
3. Deſcending, and P be acute, Z added to the oppoſite to its true place, gives ⊙.
4. Deſcending, and P be obtuſe, Z taken from its true place, gives ⊙.

Provided in all theſe caſes that the ſtar's declination and latitude be both north or both ſouth; but if one be north and the other ſouth; then, *for its true place*, read *oppoſite to its true place*, and vice verſa.

Prob. 2. To find M.

Sin. Z : ſin. P :: 20″ : M.

Prob. 3. To find A.

Rad. : ſin. ſun's elongat. from ⊙ :: M . A.

Otherwiſe without M.

Rad. × ſin. Z : ſin. ſun's elongat. from ⊙ × ſin. P :: 20″ : A.

For the aberration in right aſcenſion.

Prob. 1. To find ⊙.

Sin. ſtar's latit. : rad. :: cotang. P : tang. Z.

Then if the ſtar (in reſpect of that pole of the equator, which is of the ſame denomination as the ſtar's latitude) be in a ſign

1. Aſcending, and P be acute, Z added to its true place, gives ⊙.
2. Aſcending, and P be obtuſe, Z taken from its true place, gives ⊙.
3. Deſcending, and P be acute, Z taken from the oppoſite to its true place, gives ⊙.
4. Deſcending, and P be obtuſe, Z added to the oppoſite to its true place, gives ⊙.

Prob. 2. To find M.

Coſin. ſtar's declination × ſin Z : coſin. P × rad. :: 20″ : M.

Prob. 3. To find A.

Rad : ſin. ſun's elongat. from ⊙ :: M : A.

Otherwiſe without M.

Coſin. ſtar's declinat. × ſin. Z : ſin. ſun's elongat. from ⊙ × coſin. P :: 20″ : A.

Note 1. That ♑, ♒, ♓, ♈, ♉, ♊, are ſigns aſcending in reſpect of the north pole, and deſcending in reſpect of the ſouth pole of the equator. And ♋, ♌, ♍, ♎, ♏, ♐, are aſcending in reſpect of the ſouth pole, and deſcending in reſpect of the north pole of the equator.

2. That if the ſun's place be in that ſemicircle of the ecliptic which precedes ⊙, A muſt be taken from the ſtar's true longitude, latitude, declination, or right aſcenſion, to ſhew the apparent; but if he be in the ſemicircle following ⊙, A muſt be added.

3. That the rules give the values of M and A always in ſeconds and decimals of a degree.

Aberration *of the planets.* The aberration which the motion of light produces on the planets, is ſometimes more conſiderable than that of the fixed ſtars; for Mercury's aberration in his ſuperior conjunctions with the ſun, ſometimes amounts to 55″: however, the aberration of the planets is reducible to this one principle, which is extremely ſimple: *It is always equal to the geocentric motion of the planet, during the time which light takes up in coming from the planet to us*; which may be demonſtrated in the following manner.

It is well known that an impreſſion, or force acting, according to the diagonal of a parallelogram, is equivalent to two forces or impreſſions, according to its two ſides. It is likewiſe known, that the motion of a planet ſeen from the earth, or the motion of the earth ſeen from a planet, are perfectly the ſame; ſo that if a planet appears to move one degree a day to an inhabitant of our earth, the earth appears to an inhabitant of that planet to move juſt one degree alſo, in the ſame time. This ſuppoſed; let P (plate I. *fig.* 4.) be the planet, which we will regard as immoveable, A P T the apparent motion of the planet tranſlated to the earth: in the interval of time in which light comes from P to T, the earth having advanced from A to T, is ſtruck by the ray of light, according to the direction P T, and alſo ſtrikes the ray according to the direction A T, with the ſame velocity and the ſame force as if the ray itſelf had met the eye with the velocity C T; thus the eye receives two impreſſions of the light, one according to P T, the other according to C T; and ſo by a ſingle impreſſion compounded of the two others, it refers the planet to the diagonal B T: but the angle P T B is equal to the angle A P T, which we have taken equal to the geocentric motion of the planet; therefore the aberration is equal to the motion which the planet has during the time which light takes up in coming from the planet to the ſpectator's eye. For example, light takes up 8′ 7″ ½ of time, in coming from the ſun to us; the ſun's motion in longitude, during that interval, is 20″ of a degree; whence it follows, that the ſun has conſtantly 20″ of aberration in longitude: and as the aberration cauſes the planet to appear on the ſame ſide the earth is going, and oppoſite that towards which the planet appears to be moving, it follows, that if the longitude, for example, of a planet be increaſing, the aberration muſt diminiſh it; the ſame holds good of latitude, right aſcenſion, and declination.

On this principle the following table is conſtructed. It contains the aberration of the planets, according to their diurnal motion, and their diſtance from the earth. By only adding the conſtant logarith 9 5292, to thoſe of the planet's diurnal motion in minutes, and of its diſtance from the earth, putting that of the ſun = 10, the ſum will be the logarithm of the aberration, which aberration is always to be added to the mean or computed longitude, latitude, right aſcenſion, or declination, to obtain thoſe poſitions, ſuch as they ſhould appear on obſervation when they are decreaſing, but to be ſubtracted when they are increaſing.

A TABLE of the aberration of the planets in longitude, latitude, right aſcenſion, or declination.

Planet's diurnal motion.	Diſtance from the earth, that of the ſun being 10.								
	2.	3.	4.	5.	6.	7.	8.	9.	10.
D. M.	Sec.	Sec.	Sec.	Sec.	Sec.	Sec.	Sec.	Sec.	Sec.
0 8	0.5	0.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7
0.16	1.1	1.6	2.2	2.7	3 2	3.8	4.3	4.9	5.4
0.24	1.6	2.4	3.2	4.1	4 9	5.6	6.5	7.3	8.1
0.32	2.2	3.2	4.3	5.4	6.5	7.5	8.7	9.7	10.8
0.40	2.7	4.1	5.4	6 8	8.1	9.4	10.8	12.2	13.5
0.48	3.2	4 9	6.5	8.1	9.7	11.3	12 9	14.6	16.2
0.56	3.8	5.7	7.6	9.4	11.4	13.2	15.1	17.0	18.9
1.00	4.1	6.1	8.1	10.1	12.1	14 6	16.2	18.3	20.3
1. 4	4.3	6.5	8.7	10.8	12.9	15.2	17.3	19 5	21.6
1. 8	4.6	6.9	9 2	11.5	13.8	16.1	18.4	20.7	23.0
1.12	4.9	7.3	9.7	12.2	14.6	17.0	19.5	21.9	24.4
1.16	5.1	7.7	10.3	12.9	15.4	18.0	20 1	23.1	25 7
1.20	5.4	8.1	10.8	13.5	16.2	18.9	21.6	24 3	27.1
1.24	5.7	8.5	11.4	14.2	17.0	19.9	22.7	25.6	28.4
1.28	5.9	8.9	11.9	14.9	17 9	20.8	23.8	26.8	29.8
1.32	6.2	9.3	12.4	15.6	18.7	21.8	24.9	28.0	31.1
1 36	6.4	9.7	13.0	16.2	19 5	22.7	26.0	29.2	32.5
1.40	6.8	10.2	13.5	16.9	20.3	23.7	27.1	30.4	33.8
1.44	7.0	10.6	14.1	17.6	21.1	24 6	28.1	31.7	35 2
1.48	7.3	11.0	14.6	18 3	21.9	25.6	29.2	32 9	36.5
1.52	7.6	11.4	15.2	18.9	22.7	26.6	30.3	34.1	37.9
1.56	7.8	11.8	15.7	19.6	23.5	27.5	31.4	35.3	39 2
2.00	8.1	12.2	16.2	0.3	24 4	28.4	32 5	36.5	40.6
2. 4	8.4	12.6	16.8	1.0	25.2	29.4	33.6	37.7	41.9
2. 8	8.6	13.0	17.3	21.6	26.0	30.3	34.6	39.0	43.3
2.12	8.9	13.4	17.9	22.3	26.8	31.3	35.7	40.2	44.6
2 16	9 1	13 8	18.4	23.0	27.6	32.2	36.8	41.4	46 0

Add to the obſerved or apparent poſition, and ſubtract from the mean poſition, when they are increaſing.

Subtract from the obſerved place, and add to the computed place, when the planet's motion is diminiſhing.

Although this table goes no farther than to the diſtance 10, equal to that of the ſun, yet it may be extended, at pleaſure, by ſimple multiplication. For example, if a comet, twice as far from the earth as the ſun, that is 20, has 1 degree of diurnal geocentric motion retrograde, take, in the column of 2, the aberration for 1 degree, which is 4″. 1, and multiply it by 10, the product will be 41″. 0, to be ſubtracted from the obſerved place of the comet.

The two following tables for the aberration of the planets will be found to be very eaſy and uſeful.

Elongation, or diſtance, from the ſun, ſeen from the earth.			Aberration in longitude.					
			Mars	Jupiter	Saturn	Elongation		Venus
Signs		Deg.	Sec.	Sec.	Sec.			Sec.
0	XII	0	−36	−28	−26	Sup. ☌	0	−43
		15	35	28	25		15	41
I	XI	0	32	26	23		30	34
		15	28	22	20		45	19
II	X	0	23	18	16	Greateſt digr.		14
		15	17	14	11		45	9
III	IX	0	12	8	6		30	0
		15	7	3	1		15	+ 3
IV	VIII	0	3	+ 1	+ 4	Infer. ☌	0	3
		15	0	5	8			
V	VII	0	+ 2	8	11			
		15	3	10	1[illegible]			
VI	VI	0	4	11	1			

Mercury's aberration in longitude.				
Diſtance of the ſun.		Aphel.	Mean diſt.	Perihel.
	Deg.	Sec.	Sec.	Sec.
Superior part of the orbit.	0	−4[illegible]	−51	−55
	5	48	59	54
	10	46	48	49
	15	43	43	38
	20	38	33	::
	25	30	··	
Greateſt digreſſion	—	17	18	19
	25	5	··	
	20	+ 1	+ 4	::
Inferior part of the orbit.	15	5	5	[illegible]
	10	7	9	+ 10
	5	9	11	14
	0	9	12	1

When Mercury is ſome degrees from his greateſt digreſſions, his geocentric motion ſhould be carefully had from aſtronomical tables or ephemerides, and his aberration be made out from the firſt of the three preceding tables.

Mercury's aberration in latitude, at his deſcending node, is 4″ ⅓; that of the reſt of the planets is not near ſo much.

It was obſerved before, that the ſun's aberration in longitude is conſtantly 20″, and therefore it can never vary his longitude; but it may alter his declination near 8″. This principally takes place near the equinoxes, and vaniſhes wholly about the ſolſtices.

The moon's aberration never amounts to more than two thirds of a ſecond, and conſequently is altogether inſenſible.

Aberration *in Optics*, a diſperſion of the rays of light, reflected by a ſpherical ſpeculum, or refracted by a ſpherical lens, in conſequence whereof they cannot unite in one and the ſame focal point. This aberration, as ariſing from two different cauſes, is of two kinds, the one owing to the figure of the ſpeculum or lens, the other to unequal refrangibilities in the rays themſelves; the diſcovery of which was made by Sir Iſaac Newton; and therefore this latter ſpecies is ſometimes called by writers of optics, the Newtonian aberration of rays. See Speculum, Lens, and Focus.

ABETTOR, in law, a perſon who incites, ſtirs up, counſels, or procures others to commit a crime.

The word is formed from the Saxon *a*, an energetical article, and *betan*, to ſtir up or excite.

ABEYANCE, in law, ſomething that exiſts in expectation only. Thus if lands be leaſed to A. B. for life, with remainder to another perſon for years, the remainder for years is an *abeyance* till the death of the leſſee.

The word is derived from the French *béer*, to wait for or expect.

ABIB, the name of the firſt month of the eccleſiaſtical year among the Hebrews. It began at the vernal equinox, and anſwers to part of our March and April.

The word is Hebrew, and ſignifies *an ear of corn*; becauſe the firſt corn was then ripe in Paleſtine.

Abraham, who was a practical aſtronomer, brought the Chaldæan, or original year of the world, into Canaan; but, ſettling among the Canaanites, he probably uſed their year, which commenced about the autumnal equinox, as Taaut or Thoth, the ſon of Miſor or Miſraim, had ſettled that epocha in Phœnicia, and afterwards in Egypt, according to Sanchoniatho. Abraham, however, preſerved the memory of the epocha of the Chaldean year in his family, and among his poſterity. When the Iſraelites went into Egypt, they uſed the Egyptian year, which had the ſame epocha with the Phœnician; but at their exodus, or going out of Egypt, they were commanded by God to begin the year at the original epocha of it, namely, at the vernal equinox; and to uſe this epocha only in their ſacred inſtitutions, their feaſts, faſts, and other religious matters: but in civil affairs they ſtill retained the epocha of the Egyptian year. So that the eccleſiaſtical year began at the vernal equinox, and all their ſacred rites were regulated by it:

while the Sabbatical and Jubilean years began at the autumnal equinox; but the months were counted from the vernal equinox only. Hence the month *Abib*, or *Niſan*, which before was the ſeventh month, was by God's particular command to Moſes, reckoned the firſt month of the year; and that which had been called the firſt, was termed the ſeventh month. Hence the Chaldee paraphraſt on the 1 Kings, chap. viii. 3. ſays, the month Ethanim, which was called by the ancients the firſt, is now called the ſeventh.

ABIES, in botany, the fir-tree. See FIR-TREE.

ABIGEUS, in law, the ſame with ABACTOR, or one who ſteals whole herds of cattle.

ABINTESTATE, a word uſed in the civil law, and applied to a perſon who inherits from a perſon that died inteſtate, or without a will.

ABISHERING, in old law books, ſignifies a freedom or liberty from amercements. It is often found in charters or grants, where it implies that the perſon to whom ſuch grant is made, is intitled to the forfeitures and amercements of all others within his fee for tranſgreſſions; and at the ſame time, is himſelf free from the controul of any within that diſtrict.

ABJURATION, the renouncing or denying a thing or oath. Thus the abjuration of hereſy is the ſolemn renunciation of ſome doctrine as wicked and falſe.

The word is Latin, and compounded of *ab*, againſt, and *juro*, to ſwear.

ABJURATION, in law, implies a ſworn baniſhment, as an oath taken to forſake the realm for ever.

ABLACTATION, in phyſic, implies the weaning of a child. See the article WEANING.

The word is Latin, and compounded of *ab*, from, and *lac*, milk.

ABLACTATION, in gardening, is a ſpecies of grafting, now called grafting by approach. See GRAFTING.

ABLAQUEATION, in gardening, is the act of taking the earth from the roots of trees, in order to expoſe thoſe parts to the immediate influence of the ſun, air, and rain. Our gardeners call it *baring of trees*.

The word is formed from the Latin *ab*, and *lacus*, a ditch.

ABLATIVE, in grammar, the ſixth caſe of Latin nouns.

The word is formed from *auferre*, to take away.

This caſe is peculiar to the Latin language, and is oppoſed to the dative, becauſe the former expreſſes the action of taking away, and the latter of giving.

ABLECTI, a ſelect body of ſoldiers among the Romans, choſen from thoſe termed *extraordinarii*.

ABLEGMINA, among the ancient Romans, ſignified thoſe parts of the intrails of victims, which were ſprinkled with flour and burnt upon the altar.

ABLUENTS, in medicine, are the ſame with diluents, or ſuch as carry off acrimonious and ſtimulating ſalts from the ſtomach and bowels.

ABLUTION, in a religious ſenſe, ſignifies the act of waſhing or purifying the body with water, a ceremony in uſe among the ancient Romans, and ſtill practiſed with the utmoſt ſtrictneſs by the Mahometans. It is uſed in the church of Rome to ſignify the little wine and water which the communicants formerly drank after the hoſt.

ABLUTION, in pharmacy, is the waſhing or purifying a body by frequent affuſions of warm water, or any proper fluid. See EDULCORATION.

ABOLITION, the act of deſtroying or reducing a thing to nothing. In law, it ſignifies the eraſing any particular from the memory, ſo as no farther proſecution may enſue.

ABOMASUS, or ABOMASUM, the name of the fourth ſtomach of a beaſt that ruminates or chews the cud. The firſt is called venter, the ſecond reticulum, the third omaſus, and the fourth abomaſus. The abomaſus is that commonly called the maw, where the chyle is formed, and from whence the food deſcends to the inteſtines.

ABOMINATION a term uſed in ſcripture with regard to the Hebrews, who being ſhepherds, are ſaid to have been an abomination to the Egyptians; becauſe they ſacrificed the ſacred animals of that people, as oxen, goats, ſheep, &c. which the Egyptians eſteemed as abominations, or things unlawful. The term is alſo applied in the ſacred writings to idolatry and idols, becauſe the worſhip of idols is in itſelf an abominable thing; and at the ſame time the ceremonies obſerved by idolaters were always attended with licentiouſneſs, and other odious and abominable actions. The *abomination of deſolation*, foretold by the prophet Daniel, is ſuppoſed to imply the ſtatue of Jupiter Olympius, which Antiochus Epiphanes cauſed to be placed in the temple of Jeruſalem. And the *abomination of deſolation*, mentioned by the Evangeliſts, ſignifies the enſigns of the Romans, during the laſt ſiege of Jeruſalem by Titus, on which the figures of their gods and emperors were embroidered, and placed upon the temple after it was taken.

ABORIGINES, a name applied to the original or firſt inhabitants of any country; but is particularly uſed to ſignify the ancient inhabitants of Latium, a part of Italy now called Romania, or Campagna di Roma.

ABORTION, in phyſic, is a ſpaſmodico-convulſive motion of the uterus, by which an immature and dead fœtus is violently excluded, and generally preceded with an enormous flux of blood.

An abortion generally happens between the ſecond and third month; ſometimes between the third and fourth; and more rarely between the fifth and ſixth month of pregnancy, about the time that the menſes were wont to flow. There are not wanting inſtances of the placenta being violently ſeparated from the womb about the ſeventh month, with a large flux of blood, whereupon the infant's, and unleſs nature be ſtrong enough to expel it, the mother's life is greatly in danger.

The ſigns of an approaching abortion are not unlike thoſe of a natural birth. In both caſes there is a ſhivering and coldneſs; a preſſing pain in the loins, extending itſelf to the pelvis; afterwards it proceeds to the os ſacrum, coxendix, and groin, with a ſtronger pulſation of the arteries; the os uteri is moiſt and relaxed, and a water like the waſhing of fleſh breaks forth. Particularly in an abortion there is pure blood, which clots in a pretty large quantity, with great weakneſs; ſometimes fainting, and on the third day the fœtus is expelled. There often precedes a ſudden rigour and horror, with laſſitude, inappetence, nauſea, palpitation of the heart, a pain in the loins, a heavy pain about the pubes, and the genital parts are cold. The greater the fœtus is the more ſharp are the ſpaſms, and the pains and ſymptoms as well as the danger are the greater. *Hoffman.*

The forerunners of an abortion are a pain in the loins, or rather in the bottom of the uterus; a dull heavy pain in the inward parts of the thighs; ſlight ſhivering between the fleſh and the ſkin; the belly, from being eminent and pointed about the navel, becomes flat and depreſſed; the infant is motionleſs; the breaſts ſubſide and become flaccid; a ſmall flux of blood or ſerum oozes from the uterus, and is ſucceeded by an efflux of the waters, flooding, &c. with acute colic pains in the uterus from its convulſive contraction; pain about the os pubis, and os ſacrum, from the falling down of the fœtus to the orifice of the uterus; a deſire of going to ſtool; then follow weakneſs, convulſive contractions by conſent of parts, a ſyncope, and other ſymptoms. *Aſtruc.*

Women that abound with blood often have their menſes in the ſecond and third month of pregnancy, without any bad ſymptoms. In this caſe the blood, which proceeds from the veſſels of the vagina, yields relief; I have known it happen in the middle of the pregnancy, without detriment to the fœtus. The moſt violent drugs will not procure abortion in ſome women. I have known ſome afflicted with acute fevers, the ſmall-pox, meaſles, diarrhœas, and even dyſenteries, and yet the fœtus has remained ſafe and ſound. Others have travelled night and day in mountainous countries, or have been greatly fatigued with exceſſive dancing without any harm. Nor do ſudden fires, or other terrifying accidents, cauſe many abortions, if any at all.

However, women full of blood, inactive, ſoft, fat, of a more ſubtile habit of body, who live high, are weakly, of greater ſenſibility, hyſteric, inordinate in their menſes, who have miſcarried, or whoſe mothers were prone thereto, are more liable to abortion than robuſt, ſtrong, fleſhy women of the loweſt claſs, who are not fat but inured to labour, and not apt to be terrified on every ſlight occaſion. *Hoffman.*

Abortion is cauſed by the ſeparation of the placenta from the uterus, by the extravaſation of ſome fluid; by a corrugation of the placenta, by violent ſhocks; ſuch as violent fevers, ſmall-pox, lues venerea, vomiting, teneſmus, convulſions, &c. from ſtrong cathartics, emmenagogues, hæmorrhages, ſudden paſſions, frights, ſorrow, violent motions, as leaping, dancing, riding, jolting in carriages, raiſing great weights, ſtrokes on the belly, falls and fluxes of all kinds. *Aſtruc.*

To prevent abortion, bleeding is uſeful and neceſſary about the end of the third month of pregnancy, more or leſs according to the conſtitution of the patient. When there are gentle pains in the loins, deſcending to the hips and os ſacrum, then bleeding in the upper parts is abſolutely neceſſary. The body, in the firſt month eſpecially, ſhould be kept open with manna, rhubarb, or the like.

Abortion is alſo uſed, though ſomewhat abuſively, to ſignify a fœtus, which, dying in the womb, continues there beyond the time of geſtation.

ABORTIVE is, in general, applied to whatever comes before its legitimate time, or to a deſign which miſcarries.

ABRA, a ſilver coin ſtruck in Poland, and worth about one ſhilling Engliſh. It is current in ſeveral parts of Germany, Conſtantinople, Aſtracan, Smyrna, and Grand Cairo.

ABRACADABRA, a magical or cabaliſtical word, recommended by Serenus Samonicus as a cure for agues. But we live in an age too much enlightened to render it neceſſary for us to ſhew that the virtues attributed to this charm are merely chimerical.

The word, according to Selden, is formed from *Abracax*, the name of a Syrian idol.

ABRAHAM's Balm, in botany, a name ſometimes given to hemp. See **Hemp**.

ABRAHAMITES, an order of monks, who in the ninth century were exterminated by Theophilus for the worſhip of images. It is alſo the name of a ſect of heretics, who renewed the errors of the Paulicians.

ABRASION, in phyſic, implies a ſuperficial exulceration of the membranous parts, attended with the loſs of ſubſtance. Thus there is ſaid to be an abraſion of the inteſtines, when the internal membrane is ulcerated, and minute pieces of it are voided with the excrement. This is too often the effect of draſtic purges, and can only be relieved by emollients capable of blunting the ſpiculæ of ſuch medicines.

ABRAXAS, or **Abrasax**, a myſtical name uſed in the ancient philoſophy and theology of certain heretics, particularly the Baſilidians.

Some of the modern authors are of opinion that Baſilides called the Supreme Being by the name *abraxas*; but St. Jerome tells us, that *abraxas* was properly the name of Mithras, or the ſun; and Ireneus adds, that the Baſilidians gave no name whatſoever to the Supreme Being. "The father of all things, ſay they, is ineffable, and hath no name."

M. Baſnage, in his hiſtory of the Jews, obſerves, that the word *abraxas* owes its origin to the Egyptians; for we meet with a great number of amulets, on which is an Harpocrates ſitting on the lotus, with the flagellum in his hand, and the word *abraſax*. In the ſeventeenth century two taliſmans were found, on one of which was the word ΑΒΡΑϹΑΣ in Greek capitals; and on the other, ſtill preſerved in the cabinet of St. Genevieve, the following inſcription: ΑΒΡΑϹΑΞ. ΑΔΩΝΑΙ. ΔΑΙΜΟΝΩΝ. ΔΕΞΙΑΙ. ΔΥΝΑΜΕΙϹ. ΦΥΛΑΞΑΤΕ. ΟΥΛΒΙΑΝ. ΠΑΥΛΕΙΝΑΝ. ΑΠΟ. ΠΑΝΤΟϹ. ΚΑΚΟΪ. ΔΑΙΜΟΝΟϹ. That is, "Abracas Adonai, lord of demons, good "powers, preſerve Ulpius Paulinus from every evil "demon."

M. de Bauſobre has been fortunate enough to diſcover the true meaning of the word *abraxas*. "I believe, ſays "that ingenious writer, that *abraxas*, or *abraſax*, is compounded of two Greek words; the firſt is αβρος, which "has divers ſignifications, and among others, that of "*beautiful* and *magnificent*, and is an epithet or attribute "of the god *Iao*, as we find in the oracle of Apollo, related by Macrobius, Saturnal. l. 1. 17.

> Κειματι μεν τ᾽ Αιδην, Δια δε εαρος ερχομενοιο,
> Ηελιον δε θερευς μετοπωρα δ᾽ αβρον Ιαω.

That is, *Pluto preſides over the winter, Jupiter over the ſpring, the Sun over the ſummer, and the beautiful Iao over the autumn.* "It is commonly tranſlated *mollis Iao*, which "does not ſignify a ſoft, weak divinity, but a divinity "which furniſhes mankind with all the delicacies of life, "and preſides over autumn, which is the ſeaſon of wine "and fruits — Αβρος likewiſe ſignifies *beautiful*, *majeſtic*, "*ſuperb*, whence the αβραβαινειν, of Euripides, to expreſs a ſuperb majeſtic gait. In the verſes cited above "Iao is Bacchus; and Bacchus is the ſun, as Macrobius "has endeavoured to ſhew: but, however that be, αβρος "is an epithet frequently given to the ſun. — The other "Greek word, of which *abraſax* is compoſed, is either "ΣΑΩ, which is often uſed by Homer, and ſignifies *to* "*ſave*, or *to cure*; or ΣΑ, which implies *ſafety* or *health*. "Thus *abraſax* literally ſignifies the beautiful, the magnificent Saviour, he who cures diſeaſes and preſerves us "from them." *Hiſt. du Manichieſm, tom.* ii. *p* 55.

ABRIDGEMENT, an epitome, ſummary, or ſubſtance of a diſcourſe, in which only the eſſential part of what is elſewhere treated of more at large is preſerved.

Abridgments are very convenient for ſuch as have neither leiſure to conſult the originals, ability to purchaſe them, or talents to underſtand what a correct and ſkilful compiler lays before them. But then they ſhould convey a thorough knowledge of the matter treated of, and become what a miniature painting is to a picture drawn at full length. We may give a general idea of an extenſive hiſtory, or other matter; but we ſhould not enter upon a detail which we cannot explain, and of which we can only convey a confuſed notion, without yielding inſtruction, or reviving any ideas the reader had before acquired. Thus, for inſtance, if we ſay that Rome was at firſt governed by kings, whoſe authority continued during life, afterwards by two conſuls annually choſen, though that cuſtom was interrupted for ſome years; that then they elected the decemviri, and inveſted them with the ſupreme authority, but ſoon after reſumed their old cuſtom of electing conſuls; till at length Julius Cæſar, and after him Auguſtus, ſeized the ſupreme authority, from which period they and their ſucceſſors were ſtiled emperors; this account ſeems to convey a clear idea, and to be eaſily underſtood; but there are too many abridgments that give us only a confuſed notion, without the leaſt degree of certainty.

Abridgment is alſo uſed to expreſs a ſhort or contracted method of writing by uſing the initial letter, or ſome contraction of the word for the word itſelf; as *hon.* for honourable, A. D. for *anno domini*, &c. This cuſtom was greatly in uſe among the ancients, where we often meet with D. O. M. *deo optimo maximo*, A. R. S. H. *anno reparatæ ſalutis humanæ*, &c. In Latin epiſtles we commonly find S. P. D. *ſalutem plurimam dicit*; and in inſcriptions D. V. C. *dicat vovet conſecrat.* Sertorius Urſatus has publiſhed a collection of explanations *de Notis Romanorum.*

Abridgement, in law, ſignifies the making a declaration or count ſhorter, by leaving out ſome of the ſubſtance. A man is ſaid to abridge his plaint in aſſize, and a woman her demand in an action of dower, where any land is put into the plaint or demand, which is not in the tenure of the defendant; for if the defendant pleads non-tenure, joint tenancy, &c. in abatement of the writ, the plaintiff may leave out thoſe lands, and pray that the tenant may anſwer to the reſt. The reaſon for this abridgment of plaint is, becauſe the certainty is not ſet down in ſuch writs, but they run in general; and though the demandant hath abridged his plan in part, yet the writ will hold good for the remainder.

Abridgment, in mathematics, is particularly uſed for the reducing a compound equation to a more ſimple form of expreſſion, by repreſenting all the known quantities of the ſame term by one ſingle letter.

Thus in the equation $x^3-ax^2+abx-abc=0$, by putting $-a=n$, $ab=p$, $abc=q$, inſtead of the equation firſt propoſed, we have this more ſimple but equivalent one $x^3-nx^2+px-q=0$.

ABROGATION, the aboliſhing or totally repealing a law.

ABROTANUM *Mas*, in the materia medica, a plant well known in England by the name of ſouthernwood. It has ſmall woody branches; numerous greyiſh green leaves divided into ſlender ſegments; and ſmall yellow naked diſcous flowers, hanging downwards, in cluſters, along the ſides of the ſtalks and branches.

This plant is a native of open mountainous places in the warmer climates. With us it is raiſed in gardens from ſlips or cuttings, ſeldom producing ſeeds, and not often flowers. The leaves fall off in the winter; the roots and ſtalks are perennial.

The leaves and tops of ſouthernwood have a ſtrong ſmell, to many people agreeable, and a nauſeous penetrating bitteriſh taſte; they loſe a little, by drying, both of their taſte and ſmell. The flowers are ſomewhat weaker than the leaves. The cortical part of the younger roots has a light not ungrateful bitterneſs, with little or nothing of the peculiar flavour of the herb.

Infuſions of the leaves made in water are of a browniſh hue, in taſte and ſmell not unpleaſant; decoctions are darker coloured and very nauſeous. In diſtillation with water, there ariſes an eſſential oil of a bright yellow colour, in ſmell exactly reſembling the plant. This oil diſtils ſlowly, and towards the end of the proceſs proves very foul; rectified or diſtilled a ſecond time with freſh water, it leaves behind a conſiderable quantity of inodorous and almoſt inſipid reſinous matter. From ſixteen pounds of the freſh leaves and tops were obtained ſcarcely three drams of oil, which left in rectification above half a dram of reſin.

Tinctures of the leaves, made in rectified ſpirit, are of a deep green colour, and taſte ſtrongly of the ſouthernwood; the ſmell is covered by the ſpirit. The ſpirit, diſtilled off from the filtered tincture, has very little of the flavour of the herb; the remaining extract retains a conſiderable ſhare of its ſmell, and reſembles it more perfectly in taſte than an extract made by water, though it is much leſs ungrateful than either that extract or the herb in ſubſtance. Rectified ſpirit appears to diſſolve the aromatic part more eaſily, and the nauſeous part more difficultly, than watery menſtrua.

This bitteriſh pungent plant has been employed as a moderately ſtimulating deobſtruent, in different cachectic diſorders, as an anthelmintic, and as poſſeſſing ſome degree of an anodyne or antiſpaſmodic virtue, depending on the oil or odorous matter. In the preſent practice it is ſcarcely otherwiſe made uſe of than for external purpoſes, as an ingredient in diſcutient and antiſeptic fomentations; in which intention it appears to be of no inconſiderable efficacy. It has likewiſe been recommended in unguents for promoting the growth of hair; a virtue to which it does not appear to have much claim. *Lewis's Hiſtory of the Materia Medica.*

Abrotanum *Femina*, the name of a plant called in Engliſh, lavender cotton. It is a buſhy ſhrubby plant, all over hoary; with oblong ſlender leaves, compoſed each of four rows of little knobs ſet along a middle rib; and naked, diſcous, yellow flowers ſtanding ſolitary on the tops of the ſtalks.

It is a native of the ſouthern parts of Europe; flowers in our gardens from June to near the end of ſummer; and holds its leaves all the winter.

This plant is ſuppoſed to agree in virtue with the foregoing abrotanum, and to be the moſt effectual of the two as an anthelmintic. It has been cuſtomary among the common people to uſe, in this intention, a decoction of the leaves made in milk, which receives from them a thick conſiſtence, and a ſtrong though not very diſagreeable taſte.

On careful examination, the two abrotana appeared to differ very conſiderably in quality. The femina is in ſmell weaker and leſs agreeable than the mas; in taſte, nauſeous and acrid, but void of the penetrating bitterneſs which prevails in the other. Infuſions, tinctures, and extracts prepared from the femina, are more unpleaſant than thoſe of the mas, though not bitter. The eſſential oils of the two plants, and of conſequence their diſtilled waters and ſpirits, approach nearer in flavour to one another, though not entirely alike.

Theſe differences, doubtleſs, affect their virtues as internal medicines. Nevertheleſs, for fermentations, which is the principal uſe that either of them is applied to in the preſent practice, they may be looked upon as very nearly alike: hence the college of phyſicians at London, under the name abrotanum, allow either the mas or femina to be taken indifferently. *Lewis's Hiſtory of the Materia Medica.*

ABROTONITES, a wine mentioned by Dioſcorides impregnated with abrotanum or ſouthernwood: it is recommended as a diuretic, and good in diſorders of the ſtomach, loſs of appetite, and in the jaundice.

ABRUS, a kind of kidney-bean, growing in Egypt and the Eaſt-Indies.

ABSCEDENTIA, in ſurgery, decayed parts of the body, which, in a morbid ſtate, are ſeparated from the ſound, or loſe that union which was preſerved in a natural ſtate of health.

ABSCESS, in ſurgery, is a tumor containing pus or purulent matter.

All abſceſſes are the conſequences of an inflammation: the ripening of abſceſſes is promoted by means of cataplaſms, poultices, &c. The exceſſive heat of the tumor, and the throbbing pains which are felt, attended by a fever, are ſigns that the inflammation will terminate in a ſuppuration; the irregular ſhiverings, which come on upon the heightening of theſe ſymptoms, denote that the ſuppuration is forming: the abſceſs is formed when the matter is turned into pus: the diminution of the tenſion, fever, pain and heat, together with a ceſſation of the throbbing, are rational ſigns; and the ſoftening of the tumor and fluctuation are ſenſible ſigns which foretel that termination.

Abſceſſes are opened either by cauſtics or inciſion, and cannot be cured but by an evacuation of the pus: but in critical tumors, which are ſometimes occaſioned by malignant fevers, cauſtics are preferable. The application of a cauſtic fixes the humour in the part where nature ſeems to have depoſited it, and hinders reſorption, which would be dangerous, and oftentimes mortal. Cauſtics diſpoſe the part to a plentiful ſuppuration, and accelerate the formation of it; and, with this view, are uſed before the maturation is perfect: they are likewiſe applied to ſuch tumors as form themſelves ſlowly, and by congeſtion, as well as to thoſe which form in the ſhape of a cone, and whoſe circumference is hard, ſo that the converſion of the humour into pus would be either difficult or impoſſible, without their aſſiſtance.

To open a tumor by means of a cauſtic, it muſt be covered with a plaiſter, in the middle whereof is left an orifice of ſuch ſize as may be judged moſt convenient, and in which a proper potential cauſtery muſt be put, in order to be applied to the ſkin; if the cauſtic be ſolid, it muſt be wetted before it is applied. The whole is to be covered with another plaiſter, proper compreſſes, and a retentive bandage. In about five or ſix hours, more or leſs, when, according to the activity of the cauſtic, it is judged that the eſchar muſt be formed, the dreſſings are taken off, and the eſchar divided, from one end to the other, with a biſtoury; in the doing of which great care is to be taken to go down as low as the pus: after the operation, the wound is dreſſed with digeſtives, and the eſchar ſeparates in a few days with a plentiful ſuppuration. In common caſes of abſceſſes, it is beſt to divide the eſchar with an inciſion knife, obſerving to plunge it into the center of the abſceſs. When the whole length of the abſceſs is opened, the finger is introduced into its cavity; and if there be any membranes which form partitions, and divide the abſceſs into ſeveral cellulæ, they muſt be cut with the point of the ſciſſars, or with the biſtoury. In all theſe caſes, the inſtruments muſt be conducted by the end of the finger, for fear of injuring any of the parts which may be taken for membranes without that precaution: if the ſkin is very thin, it muſt be cut off with the ſciſſars or the biſtoury; though the latter inſtrument is preferable, as it occaſions leſs pain, and renders the operation quicker. The inciſion ſhould be always made at the loweſt part of the abſceſs, and the ſkin ſpared as much as poſſible, on which account counter openings are often made when the abſceſs is very large.

ABSCISSE, or Abscissa, in mathematics, any part of the diameter or axis of a curve, contained between its vertex or ſome other fixed point, and the interſection of an ordinate. Such is the line A O (Plate I. *fig.* 5.) contained between the vertex A of the curve B A C, and the ordinate B O. The word is derived from the Latin *abſcindere*, to cut off, as being parts cut off from the axis—Others call them *ſagittæ*, q. d. arrows.

In the parabola, the abſciſſe is a third proportional to the parameter and the ordinate, and the parameter is a third proportional to the abſciſſe of the ordinate. See Parabola.

In the ellipſis, the ſquare of the ordinate is equal to the rectangle under the parameter and the abſciſſe, leſſened by another rectangle under the ſaid abſciſſe, and a fourth proportional to the axis, the parameter, and the abſciſſe.

In the hyperbola the ſquares of the ordinates are as the rectangles of the abſciſſe by another line compounded of the abſciſſe and the tranſverſe axis.

In theſe two propoſitions relating to the ellipſis and the hyperbola, the origin of the abſciſſes, or the point A, from whence they begin to be reckoned, is ſuppoſed to be the vertex of the curve, or, which amounts to the ſame, the point where the axis meets it: for if the origin of the abſciſſes be taken from the center, as is often done, then the two foregoing theorems no longer hold good.

ABSCISION, in ſurgery, is uſed in various ſenſes, but commonly to expreſs the dividing any corrupted and uſeleſs part of the body from the ſound, by means of ſome ſharp inſtrument; it is principally applied to the ſoft and fleſhy parts of the body; for this operation, with regard to the bones, is uſually ſtiled amputation.

Abscision, in rhetoric, is a figure of ſpeech, whereby the ſpeaker ſtops ſhort in the middle of his diſcourſe.

ABSCONSA, a word frequently occurring in the Monaſt. Anglican. the decretals of archbiſhop Lanfranc, and in the writings of many eccleſiaſtics among the Engliſh and French. It ſignifies a dark lanthorn uſed by the Monks at the ceremony of burying their dead.

ABSENT, in law, implies in general any one who is gone away from his habitation.

When Nicholas Bernoulli, nephew to the famous James and John Bernoulli, maintained at Baſil, in the year 1709, his theſis for the degree of doctor of laws, he determined to pitch upon a ſubject which might give him an opportunity of diſplaying his knowledge in geometry, as well as in law; and accordingly choſe for the ſubject of his theſis *de uſu artis conjectandi*, or, the application of the doctrine of probabilities to matters of Juriſprudence; in the third chapter of which he treats of the time when the abſent perſon ſhould be conſidered as dead; and according to that learned author, he is to be looked upon as ſuch, when there is twice as much reaſon to conclude him dead, as there is to believe him alive. See the article Probability.

ABSINTHIES *Vinum*, wine of wormwood. See Absinthium.

ABSINTHIUM, wormwood, in the materia medica, a perennial plant, having large winged and ſerrated leaves, of a ſtrong, pungent ſmell. In the beginning of July it throws out ſeveral ligueous, ſtriated, hoary ſtalks, two or three feet high, ſet with ſmall leaves, having at the top a ſpike of ſmall flowers of a pale yellow, growing many together, each incloſed in a ſmall ſquamous calix, containing very ſmall ſeeds.

The abſinthium vulgare, or common wormwood, uſually grows by the ſides of highways amd foot paths; but the abſinthium Romanum is propagated in gardens, by parting the plant every ſecond year, and planting the ſlips in rows at about three feet diſtance.

Of this plant there are only four ſorts uſed in medicine, viz. *the great or Roman wormwood*, *the ſmall ſort or Pontic*, *ſea wormwood*, and the *abſinthium Alpinum.* Beſides theſe, botaniſts make twenty-eight other kinds.

The great wormwood, before it blowed, yielded by chymical analyſis, a liquid phlegm of the ſame taſte and ſmell with the plant, without any ſign either of an acid or an alkali; it was mixed with concrete urinous volatile ſalt, and a ſubtile or thick oil. The black maſs which remained in the retort, being calcined in a reverberatory, its aſhes yielded by lixiviation a fixed ſalt, which was purely alkaline.

The leaves and flower-ſpikes yielded a limpid phlegm of the ſame taſte and ſmell as the plant; this phlegm at firſt ſhewed ſome ſigns of a ſmall acidity, afterwards of a ſtrong acid, and at length of an acid and an urinous alkali, with plenty of eſſential oil; a reddiſh liquor, alkline and full of urinous and concrete volatile ſalt; and an oil which was either ſubtile and eſſential, or thick and fœtid.

From the black maſs remaining in the retort, and afterwards calcined in a reverberating heat, were produced aſhes, that by lixiviation yielded a fixed ſalt, which was purely alkaline. The compariſon of the elements obtained, and of their quantity, has demonſtrated that the leaves of this plant contain more fine volatile parts than the flowers and ſeeds do; and that they have a great deal leſs acid ſalt and oil than the flower tops; from whence it follows, that the leaves contain an ammoniacal ſalt, and a good deal of ſubtile oil, and that in the tops we meet with a tartareous united with an ammoniacal ſalt; but it is probable that its efficacy principally depends upon its aromatic bitter and eſſential oil, and that though it may appear the ſame in the leaves and tops, yet it is nevertheleſs more ſubtile, open, and volatile in the leaves, on account of its intimate union with the volatile ſalts.

This plant is ordered in the jaundice, cachexy, and green ſickneſs; it kills worms and ſtrengthens the ſtomach: but is, like the generality of bitters, bad for the nerves. Several medicinal compoſitions are prepared from this plant; and, among others, the *abſinthites vinum*, or wormwood wine. To make it, take four pounds of the tops of each of the two firſt kinds of abſinthium, when freſh and in bloom; cleanſe, and either mince or bruiſe them, then put them together, with three drachms of powdered cinnamon, into a barrel which will contain fifty quarts; fill the barrel with muſt freſh expreſſed from the white grape, and ſet the barrel into a cellar, leaving the wine to ferment; when the fermentation is over, fill up the caſk with white wine, bottle it, and keep it for uſe.

A receipt for making *vinum abſinthites*, at any time.

Take the dried leaves of the two ſorts of wormwood, of each ſix drachms, and pour thereon two quarts of white wine; then put them together into a large bottle, and ſet them in the cool to macerate twenty-four hours; then, having ſqueezed out the leaves thoroughly, filtrate the liquor, and you will have a vinum abſinthites which you may keep for uſe.

ABSIS in Aſtronomy. See Apsis.

ABSOLUTE, in a general ſenſe, implies ſomething that ſubſiſts independently of others.

The word is compounded of *ab*, and *ſolvo*, to releaſe.

Absolute *Equation*, in aſtronomy, is the aggregate of the optic and eccentric equations. The apparent inequality of a planet's motion ariſing from its not being equally diſtant from the earth at all times, is called its optic equation, and would ſubſiſt even if the planet's real motion were uniform. The eccentric inequality is cauſed by the planet's motion being uniform. To illuſtrate which, conceive the ſun to move, or to appear to move in the circumference of a circle, in whoſe center the earth is placed. It is manifeſt, that if the ſun moves uniformly in this circle, it muſt appear to move uniformly to a ſpectator on the earth, and in this caſe there will be no optic nor eccentric equation: but ſuppoſe the earth to be placed out of the center of the circle, and then, though the ſun's motion ſhould be really uniform, it would not appear to be ſo, being ſeen from the earth: (See Optic *Inequality*) and in this caſe there would be an optic equation, without an eccentric one. Imagine farther, the ſun's orbit to be not circular but elliptic, and the earth in its focus; it will be full as evident that the ſun cannot appear to have an uniform motion in ſuch ellipſe; ſo that his motion will then be ſubject to two equations; that is, the optic equation, and the eccentric equation. See EQUATION.

ABSOLUTE *Government* is that wherein the prince is left ſolely to his own will, not being limited by any laws. When the Danes, in 1670, made their king abſolute, they declared he was abſolved from his coronation oath.

ABSOLUTE *Gravity*, in phyſics, implies the whole force by which a body is urged downwards. See GRAVITY.

ABSOLUTE *Motion.* } { MOTION.
ABSOLUTE *Space.* } See { SPACE.
ABSOLUTE *Time.* } { TIME.

ABSOLUTE *Number*, in algebra, is a known quantity which poſſeſſes one intire part or ſide of an equation, being the product of the unknown roots in any equation. So in the equation $xx + 16x = 36$, the abſolute number is 36, being equal to the ſquare of the unknown root x added to 16 times x. Alſo in this cubic equation $x^3 + 20x^2 - 10x = 100$, the abſolute number is 100, being equal to the whole other ſide of the equation $x^3 + 20x^2 - 10x$. This is what Vieta calls *homogeneum comparationis*. See EQUATION.

ABSOLUTE, in metaphyſics, implies a being that exiſts by neceſſity of its own nature. In which ſenſe God alone is abſolute.

ABSOLUTE is alſo an epithet applied to things that are free from limitations or conditions.

ABSOLUTION, in a general ſenſe, implies the act of pardoning or forgiving. It is granted either by a prince or magiſtrate, and ſtops the execution of juſtice.

ABSOLUTION, in civil law, is a definitive ſentence, whereby the party accuſed is declared innocent, and as ſuch ſaved from the puniſhment inflicted by the laws for the commiſſion of the particular crime with which he was charged.

ABSOLUTION, in the canon law, is a juridical act, whereby the prieſt declares the ſins of ſuch as are penitent remitted.

ABSOLUTION is chiefly uſed among proteſtants for a ſentence whereby a perſon who ſtands excommunicated is releaſed or freed from that puniſhment.

ABSORBENTS, in the healing art, is a general name for all ſuch medicines as have the power of imbibing the ſuperfluous humours in the ſtomach or inteſtines. All the teſtaceous powders, chalks, earths, calcined bones, &c. are medicines of this kind.

The word is compounded of the Latin *ab*, and *ſorbeo*, to drink. Abſorbents are chiefly given when the abſorbent humors are of the acid kind. But perhaps among this numerous claſs of remedies, there is not one equal to the magneſia alba; becauſe it not only abſorbs the acid juices, but alſo by its gentle purgative quality, carries the offending matter off by ſtool.

ABSORBENT *Veſſels*, in anatomy, are thoſe which abſorb the juices of the body. Thus the lacteals are called abſorbent veſſels, becauſe they abſorb the chyle. The cutaneous veſſels are called by the ſame name, from their abſorbing a part of the water of baths, fomentations, &c.

ABSTEMIOUS, an epithet applied to perſons who uſe a ſpare diet, but eſpecially to thoſe that abſtain from wine and all other fermented liquors.

ABSTENTION, in the civil law, implies the repudiation of an inheritance by the heir, whereby the ſucceſſion is rendered vacant, and the deceaſed inteſtate, unleſs ſome proviſion be made of a ſecond heir by way of ſubſtitution.

ABSTENTION, in the medical art, is uſed to expreſs a ſuppreſſion or retention.

ABSTERGENTS, in phyſic, are redemies of a ſaponaceous nature, capable of diſſolving reſinous concretions. Caſtellus has confounded them with abluents: but this is an abuſe of terms.

ABSTINENCE, the act of refraining from certain enjoyments; particularly from eating and drinking to exceſs.

ABSTINENCE, in phyſick, has a very extenſive meaning: by this term we underſtand a privation from all ſucculent aliments. Though abſtinence is not ſufficient for the cure of diſeaſes, yet it wonderfully aſſiſts the operation of medicines, and is a ſure preſervative againſt many diſorders. We ſhould regulate the quantity of aliments we take, by the loſs of ſubſtance ſuſtained by means of exerciſe, and the time in which perſpiration is more or leſs plentiful; and at the ſame time be careful to abſtain from ſuch aliments as we have obſerved to diſagree with our conſtitution.

According to Dr. Cheyne, moſt of the chronical diſeaſes, the infirmities of old age, and the ſhort lives of Engliſhmen, are owing to repletion; and may be either cured, prevented, or remedied by abſtinence. But the kinds of abſtinence to which we are to confine ourſelves, either in ſickneſs or health, are to be deduced from the laws of diet and regimen. See the article REGIMEN.

ABSTINENTS, or ABSTINENTES, a ſect of heretics that appeared in France and Spain about the end of the third century. They are ſuppoſed to have borrowed part of their opinions from the Gnoſtics and Manicheans, becauſe they oppoſed marriage, condemned the uſe of meats, and placed the Holy Ghoſt in the claſs of created beings.

ABSTRACT, an epithet applied to both perſons and things, implying that thoſe particulars are ſeparated from all other things by an operation of the mind called abſtraction. See ABSTRACTION.

The word is formed from the Latin *abſtractum*, compounded of *ab*, from, and *traho*, to take or draw.

ABSTRACT *Ideas* are the ideas or notions we acquire of ſome general quality or property, conſidered ſimple in itſelf, without the leaſt regard to any particular ſubject.

ABSTRACT *Mathematics*, otherwiſe called pure mathematics, is that which treats of magnitude or quantity, abſolutely and generally conſidered, without reſtriction to any ſpecies of particular magnitude; ſuch are arithmetic and geometry; in this ſenſe, abſtract mathematics is oppoſed to mixed mathematics, wherein ſimple and abſtract properties, and the relations of quantities primitively conſidered in pure mathematics, are applied to ſenſible objects, and by that means become intermixed with phyſical conſiderations; ſuch are hydroſtatics, optics, navigation, &c.

ABSTRACT *Numbers* are aſſemblages of units, conſidered in themſelves, without denoting any particular and determined particulars. Thus 6 is an abſtract number, when not applied to any thing; but if we ſay 6 feet, 6 becomes a concrete number. See the article NUMBER.

ABSTRACT *Terms*, in logic, are ſuch as denote objects exiſting in the imagination only. Thus *beauty* and *uglineſs* are abſtract terms. There are ſome objects that pleaſe and appear beautiful to us; and, on the contrary, others that affect us in a diſagreeable manner: the former we ſtile beautiful and the other ugly, though there are no ſuch real ſubſtances in nature as beauty and uglineſs: they ſubſiſt entirely in the imagination.

ABSTRACT is alſo uſed as a ſubſtantive, and implies a general view or analyſis of ſome larger word.

ABSTRACTION, in phyſics, implies that operation of the mind, whereby it forms by reflection from the ſenſible impreſſions of external objects or ſome internal affection, a ſingular conception, independently of all other ideas.

As we have no other method of communicating our thoughts than that of ſpeech, neceſſity and cuſtom induced us to give names both to real objects, and metaphyſical conceptions; and thoſe names have greatly contributed towards enabling us to diſtinguiſh theſe conceptions.

The uniform ſenſation, for inſtance, that all white objects excites in us, has led us to give the ſame qualified names to each of theſe objects; we ſay of each of them in particular, that it is white; and afterward, in order to denote the point wherein all theſe objects reſemble one another, we have coined the word whiteneſs; therefore there are, in fact, ſuch objects as we call white; but there is not, except in our imagination, any being which we term whiteneſs.

Thus whiteneſs is only an abſtract term; it is the produce of our reflection, owing to the uniformities of particular impreſſions, that ſeveral white objects have made in us; it is the point to which we refer all thoſe impreſſions which are different on account of their particular cauſe and uniform in regard to their kind.

There are objects whoſe aſpect affects us in ſuch a manner, that we call them beautiful; and afterwards, conſidering that manner of affecting apart and ſeparated from every other kind of object, we call it beauty. There are particular bodies that are extended, figurate, or rather diviſible, and have ſeveral other properties. It has happened that our mind has conſidered them ſometimes ſo far only as they are extended, ſometimes as figurate, or rather diviſible; always ſtopping at one of theſe conſiderations only, which is to make an abſtraction of all the other properties. Afterwards we have obſerved, that all bodies agree with each other, ſo far as they are extended, or ſo far as they are figurate, or rather ſo far as they are diviſible: and therefore, in order to denote theſe different points of conformity or reunion, we form to ourſelves all idea either of extent, figure, or diviſibility; and yet there is no ſuch phyſical exiſtence as can be called either extent, figure, or diviſibility, and nothing elſe.

We may diſpoſe as we think proper of every particular body that is in our power; but are we likewiſe maſter of extent, figure, or diviſibility, or is an animal, in general, of any country? and can it tranſport itſelf from one place to another?

Each particular abſtraction excludes the conſideration of every other property. If you conſider the body, ſo far as figurate, it is evident that you do not regard it either as luminous or living; you take nothing away from it. Thus it would be ridiculous to conclude from your abſtraction, that this body, which your mind only regards as figurate, could not be at the ſame time in itſelf extended, luminous, living, &c.

Abſtract ideas are then as it were the point to which we refer the different impreſſions, or particular reflections which are of the ſame kind, and from whence we remove all that is not preciſely ſo.

Such is man, he is a living being, capable of feeling, thinking, judging, reaſoning, willing, diſtinguiſhing every ſingle act of each of theſe faculties, and by thoſe means of making abſtractions.

We ſhall obſerve, under the head ARTICLE, that not having any thing in this world but real beings, it has not been poſſible that each of thoſe beings ſhould have had a proper name.

A common name has been given to all individuals that reſemble each other, and this is called by the name of ſpecies, becauſe it agrees with every individual of one kind. Peter is man, and Paul is man; Alexander and Cæſar were men. In this ſenſe the name ſpecies is only an adjective, like beautiful, good, true, &c. and upon that account there is no article joined with it. But if we regard the man, without making any particular application of the word, then the man is taken in an abſtract ſenſe, and becomes one ſpecific individual, and for that reaſon it is that the article is added; and thus it is that we ſay the beautiful, the good, the true. Theſe ſimple ſpecific abſtracts have not however been obſerved; from man has been formed humanity; from beautiful, beauty; and ſo of others.

The ſchoolmen, who found both the one and the other of theſe names eſtabliſhed, have called thoſe concrete, which we name ſpecific, individuals; ſuch as, the man, the beautiful, the good, the true. This word concrete comes from the Latin *concretus*, and ſignifies that which grows with, is compoſed, or formed, of; becauſe theſe concretes, ſay they, are formed from thoſe which they name abſtracts; ſuch are humanity, beauty, goodneſs, truth. Thoſe philoſophers have held, that as light comes from the ſun, and water grows hot only by fire, ſo in like manner man was not ſuch but by humanity; that the beautiful was not beautiful but by beauty; the good was ſo by goodneſs; and that we have true only from truth.

They have ſaid humanity, from thence man, and ſo in like manner beauty, and afterwards beautiful. But we are not thus inſtructed by nature, ſince ſhe at the firſt ſhewed us phyſics only. We began with ſeeing men, long before we either comprehended or formed to ourſelves the abſtract term humanity. We have been touched with beautiful and good, before we knew how to underſtand or form the words beauty and goodneſs; and men have been penetrated with the reality of things, and have felt an internal perſuaſion, before they introduced the word truth; they have compriſed, and they have conceived, before they knew the word underſtanding; they have willed, without knowing how to ſay they had a will; and they have remembered, before they could form the word memory.

Men ſet out with making obſervations upon the uſe, ſervice, and placing of words; and after that they invented the word grammar.

Thus grammar is, as it were, the center or point of reunion, to which the different obſervations that have been made on the uſe of words are referred. However, grammar is no more than an abſtract term, and a mere metaphyſical name; for there is no ſuch real ſubſtance as grammar, and none but grammarians have obſerved it. It is exactly the ſame thing with reſpect to the names of arts and ſciences, as well as thoſe of their different parts.

In like manner, the point to which we bring the ſeveral obſervations that have been made in relation to the good and bad uſe we can make of the faculties of our underſtanding, is called logic.

We have ſeen ſeveral creatures ceaſe to live, and on this intereſting conſideration have been quite confounded; we have obſerved the uniform ſtate of inaction wherein they all continue, when they no longer live; and, having conſidered that ſtate independently of all particular application, and as being in itſelf ſomething real, we have called it death, though death is not a real being. It is thus that different privations, as well as the abſence of thoſe objects, whoſe preſence make either agreeable or diſagreeable impreſſions on us, have excited in us a reflected ſenſe of theſe privations and abſence, and given us room to form to ourſelves an abſtract conception, even of nothing; for we underſtand ourſelves perfectly well, when we maintain that nothing has no properties, that nothing cannot be the cauſe of ſomething, and that we know nothing, or privations, only by the abſence of the realities to which they are oppoſed.

The reflection on this negation convinces us that, if we may be allowed the expreſſion, we are ſenſible of what we cannot perceive.

We have then a conception of nothing, and this conception is an abſtraction which we expreſs by a metaphyſical name, and in the manner of other conceptions; and thus it is that, as we uſe the expreſſions to take a man out of priſon, or to take a crown out of our pocket, ſo we ſay, by way of imitation, that God has taken the world out of nothing.

The cuſtom we daily have of giving names to the objects of ideas which repreſent real ſubſtances to us, has induced us to give them likewiſe, by way of imitation, to the metaphyſical objects of abſtract ideas, of which we have a conception; and hence it is that we ſpeak of them in the ſame manner as we do of real objects.

Illuſion, figure, and falſhood, have a language in common with truth. The expreſſions which we ourſelves make uſe of to convey to others either the ideas which we have within ourſelves of real objects, or of ſuch as are but ſimple abſtractions of our mind, have a perfect analogy with one another. We ſay death, ſickneſs, imagination, idea, &c. as we ſay, the ſun, the moon, &c. though death, ſickneſs, idea, &c. are not exiſting ſubſtances; and we ſpeak of the phœnix, chimera, ſphinx, and the philoſopher's ſtone, in the ſame manner as we ſpeak either of the lion, panther, rhinoceros, Africa, or Peru.

Even proſe, though with leſs ornament than poetry, realizes and forms perſons of theſe abſtract beings, and equally miſleads the imagination. If Malherbe has ſaid, that death has its terrors, that he ſtops his ears, that he leaves us to cry out, &c. do not our proſe writers always uſe ſimilar experſſions, that death reſpects no one, to wait for death, the martyrs have dared death, have ſought death, to meet death without emotion, the image of death, to face death, death does not ſurpriſe a wiſe man: neither have we a more popular expreſſion, than that death is never ſatisfied, or that death is never in the wrong.

The heathens realized love, diſcord, fear, ſilence, health, *dea ſalus*, &c. and made ſo many divinities of them. And nothing is more common with us than to realize an employment, place, or dignity: we make perſons of reaſon, taſte, genius, temper, and the paſſions of humour; character, virtues, and vices; as well as of the mind, heart, fortune, miſfortune, reputation, and nature.

The real beings which ſurround us are moved and governed in ſuch a manner as is known to God alone, and according to thoſe laws which he thought fit to eſtabliſh when he created the world: thus God is a real term, but nature is only a metaphyſical one.

Although a muſical inſtrument, upon the touching of its ſtrings, in itſelf receives but a ſimple modification, when it gives the ſound re or ſol; yet we ſpeak of theſe ſounds as if they were ſo many real beings: and in the manner that we ſpeak of our dreams, imaginations, ideas, pleaſures, &c. as if we actually dwelt in a real and phyſical country. And in truth, if we may uſe the expreſſion, we uſually ſpeak the language of the country of abſtractions.

We are ſenſible that we are moved, affected, and agitated, and the more ſo, as we perceive that we are ſenſible; and this has firſt occaſioned us to give names to different kinds of particular ſenſations, and afterwards to the general ones of pleaſure and grief; and yet there are no ſuch real ſubſtances as either pleaſure or grief.

Poets have amuſed the imagination by realizing abſtract terms; and by that means have deceived the people. But has not Plato himſelf, who baniſhed the poets from his republic, been miſled by ideas that were nothing more than the abſtractions of his own mind?

Philoſophers, metaphyſicians, and, if we may be permitted to ſay it, even the geometricians themſelves, have been miſled by abſtraction, the former by eſſential forms and occult virtues, and the latter either by privation or abſtraction. The metaphyſical point, for example, as well as length, is no more than a mere abſtraction. We may conſider the diſtance between one town and another, and be totally employed with that diſtance; we may likewiſe conſider the ſpot from whence we ſet out, and that at which we are arrived. We can even by imitation and compariſon look upon a ſtraight line in no other light than as the ſhorteſt way between two points; and yet theſe two points are no more than the extremities of the line itſelf; and, by an abſtraction of our minds, conſider theſe extremities only as terms, and ſeparate whatever elſe is not ſo; the one is the term where the line begins, the other where it ends: thoſe terms we call points, and fix to that conception the preciſe idea of term only, taking away every other idea; here then is neither ſolidity, length, nor depth, but the abſtract idea of term only.

The names of real objects are the primary, and, if we may be allowed the expreſſion, the very firſt-born among names: the others, which only expreſs the conceptions of our minds, are no more than names by imitation or adoption; they are thoſe of our metaphyſical conceptions: thus the names of real objects, as ſun, earth, moon, &c. might be called phyſical, and the others metaphyſical names.

Phyſical terms then are of uſe to ſhew that we ſpeak of real objects; whereas a metaphyſical name denotes that we ſpeak only of ſome particular conception of our mind: and therefore when we ſay the ſun, the earth, the ſea; that man, that horſe, that ſtone, &c. our own experience, as well as the concurrence of the juſteſt motives, perſuade us, that there are ſuch real objects as the ſun, earth, &c. and that if theſe objects were not real, our forefathers would never have coined thoſe names, nor ſhould we have adopted them: ſo when we ſay, the nature, fortune, proſperity, health, ſickneſs, death, &c. the vulgar, by imitation, believe that there is, independently of their manner of thinking, ſome being which we call nature, another ſtiled fortune, and ſo on: for they do not imagine that all men would ſay, the nature, fortune, life, death, &c. when there was no ſuch real object as nature, fortune, &c. as if we could have neither conceptions or imaginations, unleſs there had been real objects which were the exemplars of them.

In truth, we cannot have theſe conceptions, unleſs ſomething real gives us room to form them; but the word which expreſſes conception has not, except within ourſelves, any proper exemplar. We have ſeen gold, and obſerved mountains; and, if theſe two repreſentations give us room to form to ourſelves an idea of a mountain of gold, it by no means follows from this image, that there has been ſuch a mountain. A ſhip ſhall be ſtopped in the open ſea by ſome ſand-bank, which is unknown to the ſailors, and they ſhall imagine that it is ſome fiſh which has ſtopped them; but this imagination does not give any reality to the ſuppoſed fiſh; nor any way prevents whatever the ancients believed of a remora from being a fable, like thoſe they have imagined of the phœnix, and thought of the ſphinx, chimera, and the horſe Pegaſus. Senſible people have found it difficult to believe that there have been men ſo irrational as to realize their own abſtractions. But, among other inſtances, we might refer to the Hiſtory of Valentinian, the arch-heretick of the ſecond century of the church; this man was a Platonic philoſopher, who deviated from the ſimplicity of the faith, and imagined æons, i. e. abſtract beings, which he realized, as ſilence, truth, intelligence, &c. He began to ſpread his errors in Egypt, and went afterwards to Rome, where he gained ſeveral diſciples, who were from him called Valentinians. Tertullian wrote againſt theſe hereticks. Thus the abſtractions of the primitive times have opened a door to diſputes, which have not been the leſs violent for their being frivolous.

Finally, if we would avoid abſtract terms, we muſt be obliged to have recourſe to circumlocutions and paraphraſes, which enervate the diſcourſe. Beſides, theſe terms fix the mind; they aſſiſt us in introducing order and preciſion in our thoughts, give more grace and energy to diſcourſe, render it more lively, compact, and forcible; and, in ſhort, highly deſerve that we ſhould be acquainted with their juſt value.

Abſtractions are in diſcourſe what certain ſigns are in arithmetic, algebra, and aſtronomy: but when we do not attend to their value, or to give or take them for what they are really worth, they miſguide the mind from the reality of things, and ſo become the ſource of a multiplicity of errors.

We would therefore adviſe, that, in the didactic ſtyle, that is, when we are teaching and inſtructing, we ſhould make uſe of abſtract terms, and figurative expreſſions, with the greateſt circumſpection. For inſtance, we would not have any one ſay in logic, the incloſed idea; nor, when we judge of or compare ideas, that we ſhould unite or ſeparate them, ſince idea is no more than an abſtract term. We likewiſe uſe this expreſſion, the ſubject attracts the attribute to itſelf, in which there are nothing but metaphors that merely amuſe the imagination. Neither ſhould we ſay, in grammar, that the verb governs, wills, requires, rules, &c.

ABSTRUSE, ſomething deep, hidden, concealed, or far removed from common apprehenſions, and therefore not eaſily underſtood; in oppoſition to what is obvious and palpable.

The word is formed from the Latin *abſtruſus*, compounded of *abs*, from, and *trudo*, to thruſt; q. d. placed beyond the reach of common capacities.

Thus metaphyſics is an abſtruſe ſcience; and the doctrine of fluxions, and the method de maximis and minimis are abſtruſe points of knowledge.

ABSURD, an epithet applied to any thing that oppoſes the human apprehenſion, and contradicts a manifeſt truth. Thus, it would be abſurd to ſay that ſix and ſix make only ten, or to deny that twice ſix make twelve. When the term abſurd is applied to actions, it has the ſame import as ridiculous.

Reductio ad ABSURDUM, a method of proving the truth of a propoſition, by ſhewing that the contrary is abſurd. This method of reaſoning is often uſed by Euclid in his Elements of Geometry.

ABSURDITY, an impropriety, or ſomething that oppoſes an evident truth or principle. The contradiction is the greateſt of all abſurdities.

ABSUS, in botany, an Egyptian plant, which bears a flower of a whitiſh colour, tinged with a paliſh yellow: it grows to the height of about four fingers, and has a leaf like the trefoil. Mr. Ray is of opinion, that the abſus is the Egyptian lotus.

ABSYNTHIUM. See the article Absinthium.

ABTHANES, a title of honour uſed by the ancient inhabitants of Scotland, who called their nobles *thanes*, which in the old Saxon ſignifies *king's miniſters*; and of theſe the higher rank were ſtiled *abthanes*, and thoſe of the lower *underthanes*.

ABUCATUAIA, the Braſilian name of a fiſh, called by the Portugueſe peixe-gallo. It has ſome reſemblance to a doree, and is of the ſize, ſhape, and thickneſs of a flounder; but the mouth is ſmall, and without teeth. The iris of the eye is of a ſilver colour, and there are two long threads which hang from the lower part of the body, and a ſingle one on the back, near the back fin. It is without ſcales, and all over of a ſilver colour, except the threads, which are black. *Brookes's Natural Hiſt.*

ABUNA, the title given to the archbiſhop of Abyſſinia.

ABUNDANT *Number*, in arithmetic, is a number, the ſum of whoſe aliquot parts is greater than the number itſelf. Thus the aliquot parts of 12, being 1, 2, 3, 4, and 6, they make, when added together, 16. An abundant number is oppoſed to a deficient number, or that which is greater than all its aliquot parts taken together; as 14, whoſe aliquot parts are 1, 2, and 7, which make no more than 10: and to a perfect number, or one to which its aliquot parts are equal, as 6, whoſe aliquot parts are 1, 2, and 3. See Aliquot and Number.

ABUNDANCE, Abundantia, a heathen divinity repreſented on ancient monuments under the figure of a woman with a pleaſing aſpect, crowned with garlands of flowers, pouring all ſorts of fruit out of a horn which ſhe holds in her right hand, and ſcattering grain with her left, taken promiſcuouſly from a ſheaf of corn. On a medal of Trajan, ſhe is repreſented with two cornucopias.

ABUSE, in a general ſenſe, implies the perverting ſomething from its genuine or original intention. Thus an abuſe of words is the uſing them without any clear and diſtinct ideas.

ABUTILON, in botany, the name of a plant with a monopetalous, campiform flower, very open and indented; from the bottom there ariſes a pyramidal fiſtula, generally charged with ſtamina. The piſtil adheres to the calyx, and is fixed like a nail in the lower part of the flower and fiſtula. The piſtil becomes a fruit, reſembling the capital of a column, and is compoſed of ſeveral ſmall capſulæ placed round an axis, each capſule being inſerted into the ſtria of the axis. Theſe capſulæ open in two parts, and contain kidney-ſhaped ſeeds. *Tournefort.*

ABYSS, in a general ſenſe, denotes ſomething very profound, and as it were bottomleſs.

The word is originally Greek, *αβυσσος*, compounded of the privative *α*, and *βυσσος*, bottom, i. e. without a bottom. Suidas and others give different origins; as from *α* and *βυω*, to cover, to hide, or from *α* and *δυω*, &c. But the more judicious critics reject them, as but one degree better than that of the old ſcholiaſt, who derives *abyſſus* from *ad ipſus*, becauſe the waters flow hither in abundance.

Abyſs is alſo uſed to denote an immenſe cavern of the earth, where God collected all thoſe waters on the third day; which, in our verſion, is rendered the deep, and elſewhere the great deep.

In the language of the Holy ſcripture abyſs is made uſe of to expreſs hell, the greateſt deeps of the ſea, and the chaos that was covered with darkneſs at the beginning of the world, and upon which the ſpirit of God moved, or was carried, Geneſis, chap. i. ver. 2. The ancient Hebrews believed, as the major part of the eaſtern people do to this day, that the abyſs, ſea, and heavens, encompaſſed the whole earth; which, ſay they, was as it were plunged into and floated upon the abyſs, pretty much as a melon ſwims half above and half below water. They likewiſe believe that the earth was founded upon the waters, or at leaſt that it had its foundation in the abyſs. Under the waters, and at the bottom of this abyſs, it is that the ſcriptures repreſent to us the giants groaning and ſuffering puniſhment for their crimes. There it is that the Rephaims, thoſe ancient giants, who in their life-times made mankind tremble, are confined. In ſhort, it is within theſe dark dungeons that the prophets ſhew us the kings of Tyre, Babylon, and of Egypt, who are there buried, and yet live to expiate their pride and cruelties.

We are likewiſe told that theſe abyſſes are the habitations of devils and the wicked. "I ſaw," ſays St. John in the Revelations, "a ſtar fall from heaven; and to him "was given the key of the pits of the abyſs, or of the "bottomleſs pit." *Calmet's Dict.*

Abyss, in antiquity, is a name given to the temple of Proſerpine.

ACACIA, in antiquity, is a kind of bag, or long ſtrait roll. The conſuls and emperors, from the time of Anaſtaſius, are repreſented on medals with one of theſe in their hands. Some writers take it for a handkerchief rolled up, which the emperor made uſe of to give the ſignal for beginning the games. Others, particularly M. du Cange, think it a bundle of memoirs, which were preſented to him; and ſeveral imagine it a bag of earth, which the emperors held in one hand, as they did at the ſame time a croſs in the other, whereby they were reminded, that how great ſoever they were, yet that they muſt one day be reduced to duſt. The bag or acacia was ſubſtituted in the ſtead of the mappa, or napkin, which the emperor, conſul, or other magiſtrate, had in his hand, and made uſe of to give the ſignal in the games.

Acacia, in botany, is the name of a tree which bears leguminous flowers and leaves in pairs, oppoſite to each other: the piſtil riſes out of the calyx, is enveloped with a ſerrated membrane, and ſucceeded by a flat pod, divided into two parts, containing ſeveral ſeeds in ſhape like a kidney: the leaves of the acacia are placed in pairs on one ſide of the ſtalk, which is terminated by a ſingle leaf.

American Acacia is a tree common in that part of the world. It does not grow to any great height; its wood is hard and rough, its foliage long, but ſmall, and affording but little ſhade, and its branches are full of thorns: this tree being a quick grower, and in the ſpring bearing cluſters of very agreeable flowers, is proper to be planted in clumps of flowering ſhrubs, and in wilderneſs quarters. Its branches being very ſubject to hang down, and trail on the ground, it is cuſtomary to prop them, but this greatly disfigures the tree: the acacia is propagated by ſeed.

Acacia, in the materia medica, an inſpiſſated gummy juice, of a brown colour without, and either blackiſh, reddiſh, or yellowiſh within: it is of a firm conſiſtence, hard and melting in the mouth, has an auſtere aſtringent taſte, but is not diſagreeable. This juice is generally made up into little round lumps of four, ſix, or eight ounces weight, wrapped up in thin bladders, and is brought from Egypt. They eſteem that ſort to be the beſt which is new made, pure, clean, and eaſily diſſolves in water. This juice is expreſſed from the immature pods of a tree called *acacia folio ſcorpioidis leguminoſæ*. It is a large tree, very full of branches; its roots divide themſelves into ſeveral ramifications, ſpreading on all ſides, and its trunk is often a foot diameter, and equals, or rather ſurpaſſes the other ſorts of acacia in height: it is firm, loaded with branches, and armed with thorns; its leaves are ſlender, conjugated, and ranged in pairs in one ſide of a rib or pedicle, of the length of two fingers; they are of a dark green, about three lines in length, and ſcarce one in breadth; the flowers appear before the leaves, in form of a ſpherical bud, ſupported by a pedicle an inch in length; they are of a gold colour, and have no ſmell. Each flower conſiſts of one entire piece, reſembling a thin tube, which is protuberant at the top, and divided into five ſegments; they are adorned with a great quantity of ſtamina, and a piſtil ſucceeded by a pod, ſomething like that of a lupine, about five inches long, brown or reddiſh, flat, and of the thickneſs of a line towards the middle, but thinner on the edges; they are of an equal breadth, and ſo ſtrongly compacted at equal diſtances, that each pod repreſents ſix, eight, ten, or ſometimes more, flat piſtils tied together by a thread: their greateſt breadth is half an inch, and not above a line in the middle; the cavity of the pod is filled with a flat, hard, oval ſeed, leſs than that of the ſervice tree, of a cheſnut colour, marked with a line round it like tamarind ſeeds, and covered with a gummy mucilage, of a reddiſh colour, and an aſtringent or acid taſte: this tree is common about Grand Cairo. They waſh the pods in water before they are ripe, bruiſe them and expreſs their juice, which they boil to a proper conſiſtence, and then lay it in little heaps. This juice analized yields a moderate portion of acid ſalt, a very little alcaline ſalt, a great deal of aſtringent earth, and a large quantity of oil. It is placed among the incraſſants and repellent aſtringents, prevents vomiting, and ſtops hæmorrhages and fluxes of the belly. The doſe is from ʒß. to ʒj. given either in powder, bolus, or any liquid vehicle: the Egyptians give a drachm of it diſſolved in any liquid every morning, to ſuch as are troubled with ſpitting of blood.

ACACIA *Germanica*, the inſpiſſated juice of wild ſloes gathered before they are fully ripe. It is often uſed as a ſuccedaneum for the Egyptian acacia.

ACACIANS, a name given to a particular ſect of the Arians, from Acacius of Cæſarea, who was their chief.

ACADEMICS, a ſect of philoſophers who followed the doctrine of Socrates and Plato, with regard to the uncertainty of human knowledge, and the incomprehenſibility of truth.

Academic, taken in this ſenſe, amounts to much the ſame with what we call Platoniſt, the only difference between them being that of commencement. The ancients who embraced Plato's ſyſtem were called Academici, Academics; whereas thoſe that followed the ſame opinions ſince the reſtoration of learning, have taken the denomination of Platoniſts.

It may be ſaid, that Socrates and Plato, who laid the firſt foundations of the academy, were not ſo erroneous as thoſe who ſucceeded them; we mean Arceſilas, Carneades, Clitomachus, and Philo. Socrates indeed profeſſed to know nothing; but his doubts aroſe from phyſics only, which he at firſt diligently cultivated, and which he afterwards acknowledged to ſurpaſs the reach of human underſtanding: if he ſometimes ſpoke in the language of the ſceptics, it was out of irony or modeſty, in order to pull down the vanity of the ſophiſts, who fooliſhly boaſted, that they were ignorant of nothing, and always ready to diſpute on all manner of ſubjects.

Plato, the father and inſtitutor of the academy, who was inſtructed by Socrates in the art of doubting, and was likewiſe his avowed diſciple, confined himſelf to his own manner of treating ſubjects, and undertook to oppoſe all the philoſophers who had preceded him: but, by recommending to his diſciples a diffidence of themſelves, and to doubt of every thing, he did not intend to leave them fluctuating between truth and error; but to put them on their guard againſt thoſe raſh and precipitate deciſions, ſo natural to youth, and prevent their falling into error, by freely examining every thing without prejudice.

Arceſilas undertook to reform the ancient academy, and erect a new one. It is ſaid that he imitated Pyrrho, and converſed with Timon: ſo that, having enriched Pyrrho's art of doubting with the elegant erudition of Plato, and armed it with the dialects of Diodorus, Ariſto compared him to a chimera, and with great pleaſantry applied to him the verſes, where Homer ſays, that “She was a lion before, a dragon behind, and a goat in the middle.” Thus, according to him, Arceſilas was Plato before, Pyrrho behind, and Diodorus in the middle; for which reaſon ſome rank him in the number of the ſceptics; and Sextus Empiricus maintains, that there is but a very ſmall difference between his ſect, or the ſceptic, and that of Arceſilas, called the new academy.

He taught, indeed, that we do not even know whether we know any thing; that nature has not given us any rule of truth; that human underſtanding and the ſenſes are incapable of comprehending truth; that he found in every thing reaſons oppoſed by an equal force; and, in a word, that all things are immerſed in darkneſs, and conſequently that we muſt always ſuſpend our aſſent. His doctrine was not much applauded, becauſe he ſeemed deſirous of extinguiſhing every ray of ſcience, of throwing darkneſs on the mind, and overturning the foundations of philoſophy. Lacydes was the only perſon who defended the doctrine of Arceſilas: he tranſmitted it to Evander, one of his diſciples, and Evander tranſmitted it to Hegeſinus, who handed it down to Carneades.

Carneades however did not follow the doctrine of Arceſilas in every particular, though he retained its principal tenets: this made him paſs for the author of a new academy, which was called the third. He oppoſed, with great wit and eloquence, all the opinions propoſed to him, without diſcovering his real ſentiments. He firſt made Rome acquainted with the power of eloquence and the merit of philoſophy; and that flouriſhing ſtate, attracted by the novelty and excellence of ſo noble a ſcience, followed Carneades with ſo much eagerneſs, that Cato, a man in all other reſpects of an excellent judgment, but deficient in politeneſs, grew jealous of this new kind of erudition, which had the power of captivating the affections of mankind. Cato declared in the ſenate, that they ought to grant Carneades, and the deputies which accompanied him, whatever they demanded, and ſend them inſtantly back with honour to their country.

His eloquence was ſo powerful, that he overturned whatever he undertook to oppoſe, confounded reaſon by reaſon itſelf, and remained invincible in the opinions he maintained. The ſtoics, a contentious and ſubtle people in diſputations, and with whom Carneades and Arceſilas had frequent conteſts, found it very difficult to eſcape the ſnares he laid for them: and therefore, in order to diminiſh his reputation, they aſſerted that all he alledged againſt them was taken from the books of Chryſippus the ſtoic. Carneades, to whom Cicero allows the art of refuting every thing, modeſtly allowed, that, without the help of Chryſippus, he ſhould have done nothing; and that he would engage Chryſippus with his own weapons.

The corrections which Carneades made in the doctrine of Arceſilas are very trifling: it is eaſy to reconcile what Arceſilas ſaid, “that he found no truth in things,” with what Carneades advanced, “that he did not deny there being ſome truth in things, but that we have no rule whereby to diſcern it; for there are two kinds of truth, the one what we call truth of exiſtence, the other truth of judgment.” It is therefore plain that thoſe two propoſitions of Arceſilas and Carneades regard the truth of judgment. But the truth of judgment is in the number of relative things, which ought to be conſidered as having a relation to our mind; when therefore Arceſilas ſaid, there was nothing true in things, he meant, that there was nothing in things that the human mind could know with certainty; and this is exactly the ſame with what Carneades maintained.

Arceſilas ſaid, that nothing could be comprehended, and that all things were obſcure. Carneades granted, that nothing could be comprehended, but did not, for that reaſon, allow that all things were obſcure; becauſe probable things were not, in his opinion, obſcure. But though he made ſome difference in expreſſion, he made no difference in effect; for Arceſilas did not maintain, that all things are obſcure otherwiſe than as they cannot be comprehended, nor did he diveſt them of all ſemblance of truth or probability: this was alſo the ſentiment of Carneades; for when he ſaid, that things were not ſo obſcure, but we might diſcern thoſe which ought to be preferred for the purpoſes of life, he did not pretend that they were clear enough to be comprehenſible: it follows therefore that there was no diverſity of ſentiment between them, when Carneades permitted the wiſe man to entertain opinions, and perhaps even ſometimes to teſtify his own conſent: and when Arceſilas forbid both the one and the other, Carneades only aſſerted, that the wiſe man ought, for the common purpoſes of life, to make uſe of probable things, without which he could not live; but not in the conduct of the mind, and in the ſearch after truth; and whence only Arceſilas baniſhed both opinion and conſent: conſequently their differences conſiſted in expreſſions only, and not in the things themſelves.

Philo, the diſciple of Clitomachus, who had himſelf been a pupil of Carneades, deſerved to be ſtiled with Charmides, “ the founder of the fourth academy, ” as he differed in ſome points from the ſentiments of Carneades: for he aſſerted, that things are in themſelves comprehenſible, though we are unable to comprehend them.

Antiſchus was the founder of the fifth academy. He had been ſeveral years a diſciple of Philo, and maintained the doctrine of Carneades; but, in the decline of life, he quitted his maſter's party, and introduced into the academy the tenets of the ſtoics, which he attributed to Plato, maintaining that the doctrine of the ſtoics was not new, but a reformation of the ancient academy. This fifth academy therefore was only an aſſociation of the ancient academy, and the philoſophy of the ſtoics; or rather the ſtoical philoſophy dreſt in the habit of the old academy, which flouriſhed under Plato and Arceſilas.

Some have indeed pretended that there was only one academy: for as the ſeveral branches which ſpring from the ſame root, and ſpread themſelves on different ſides, are not different trees; ſo all thoſe ſects which ſprung from the ſingle ſtock of the doctrine of Socrates, *that man knows nothing*, though divided into ſeveral ſchools, are no more than one academy. But if we examine attentively, we ſhall diſcover ſo remarkable a difference between the old and new academies, that we muſt neceſſarily acknowledge two academies; the old, or that of Socrates and Antiochus; and the new, which was founded by Arceſilas, Carneades, and Philo: the firſt was dogmatical in ſome points, the firſt principles and ſome moral truths at leaſt were therein honoured and reſpected; whereas the new one almoſt entirely approached to ſcepticiſm.

ACADEMY, in antiquity, was anciently a garden or villa, ſituated in one of the ſuburbs of Athens, about a mile from the city, where Plato and his followers held their aſſemblies to converſe on philoſophical ſubjects. This place gave the denomination to the ſect of academics.

This villa had the name of academy given to it from one Academus, or Ecademus, a citizen of Athens, who was originally the owner of it, and made it a kind of gymnaſium. He lived in the time of Theſeus.

Cimon embelliſhed the academy, and adorned it with fountains, trees, and walks, for the convenience of philoſophers and men of learning, who here aſſembled to confer together and diſpute upon different ſubjects. It was alſo the burial-place of thoſe illuſtrious men who had done any ſignal ſervice to the republic. Sylla however paid no reſpect to this aſylum of the polite arts; for, during the ſiege of Athens, he employed thoſe very trees which formed the walks of the academy, to make engines of war to batter the place.

Cicero had alſo a villa or place of retirement near Puzzuoli, to which he gave the name of academy, and where he uſed to entertain ſuch of his friends as had a taſte for philoſophical converſations. It was there he compoſed his *Academical Queſtions*, and his books *De Natura Deorum*.

ACADEMY alſo ſignifies a ſect of philoſophers who maintained, that truth is inacceſſible to our underſtanding; that all knowledge is uncertain; and, therefore, that a wiſe man ought always to doubt and ſuſpend his judgment, without ever poſitively aſſerting or denying any thing: in this ſenſe, academy is the ſame thing as the ſect of academics. See ACADEMICS.

ACADEMY, among the moderns, is commonly uſed to ſignify a ſociety of learned men, eſtabliſhed for the culture and advancement of arts and ſciences.

Some authors confound academy with univerſity; but, though they are much the ſame in Latin, they are two different things in Engliſh.

An univerſity is properly a body compoſed of graduates in ſeveral faculties; of profeſſors, who teach in the public ſchools; of regents or tutors, and ſtudents who learn under them, and aſpire likewiſe to the ſame degree: whereas an academy is not intended to teach or profeſs any art, ſuch as it is, but to improve it; it is not compoſed of novices, to be inſtructed, but of thoſe who are more knowing; of perſons of a diſtinguiſhed capacity to confer and communicate their lights and diſcoveries to each other for their mutual advantage.

The firſt academy we read of was that eſtabliſhed by Charlemaign, at the motion of Alcuin. It was compoſed of the chief wits of the court; and the emperor himſelf was one of the members. In their academical conferences every perſon was to give an account of what ancient writers he had read; and each academician aſſumed the name of ſome ancient author, or of ſome celebrated perſon of antiquity. Alcuin, among the reſt, from whoſe letters we learn theſe particulars, took that of Flaccus, the ſirname of Horace; a young lord whoſe name was Angilbert. took upon him that of Homer; Adelard, biſhop of Corbie, called himſelf Auguſtin; Raculphe, archbiſhop of Mentz, was Dametis; and the king himſelf, David.

This may ſerve to correct a miſtake in ſome modern writers, who relate, that it was in conformity with the genius of the learned men of thoſe times, who were great admirers of Roman names, that Alcuin took that of Flaccus Albinus.

Moſt nations have at preſent academies, Ruſſia not excepted: but Italy excels in this reſpect, at leaſt, in point of number. There are but few in England; the chief and only ones that merit any great attention, are called by theſe names, viz. the Royal Society, and the Society of Antiquaries of London. See ROYAL *Society*, and ANTIQUARIAN *Society*. See alſo SOCIETY *for the Encouragement of Arts*, &c.

There are, however, beſides theſe, an academy of muſic, and another of painting, each governed by their reſpective directors.

In France there are flouriſhing academies of all kinds, ſeveral at Paris, and ſome in the provincial towns, of which the following are the chief.

French ACADEMY, inſtituted in the year 1635, by cardinal Richelieu, in order to perfect the French tongue. Its principal buſineſs is, in general, all matters of grammar, poetry, and eloquence: its form is very ſimple, and has never been altered. The members are forty in number, and not one of them has any ſuperiority over the reſt. No nobleman, or man of diſtinction, can be admitted into it upon any other account than that of being a man of letters; for cardinal Richelieu, who was well appriſed of the great advantages ariſing from parts, was deſirous that the mind ſhould keep pace with rank and nobility.

This academy has a director and a chancellor, who are drawn by lot every three months, and a ſecretary, who is perpetual. They meet at the Old Louvre three times a week, viz. on Mondays, Thurſdays, and Saturdays, all the year round. They have no public aſſemblies, except when they receive ſome new academician, and that held annually on St. Lewis's day, when the academy diſtributes the prizes of eloquence and poetry, each of which conſiſts in a gold medal. This academy has publiſhed a dictionary of the French language. Their motto is, *à l'immortalité.*

Royal ACADEMY *of Inſcriptions and Belles Lettres* was eſtabliſhed by Lewis XIV. who conſidered that it would be highly advantageous to France, to eſtabliſh an academy, whoſe whole employment ſhould be that of forming inſcriptions, devices, and medals, and diffuſe over thoſe monuments an elegant taſte, and that noble ſimplicity which conſtitutes its undoubted worth. The firſt ſociety conſiſted of a ſmall number, choſen out of the members of the French academy, who, upon their eſtabliſhment, met in the library of M. Colbert, from whom they received his majeſty's orders.

The days of their meetings were not determined; but they were commonly on Wedneſday, eſpecially in the winter ſeaſon. In ſummer they often retired to Sceaux, in order to render their conference more harmonious, and that the miniſter might himſelf enjoy the pleaſure of their company with more tranquillity.

It is ſaid that the ſubject of the deſigns for the king's tapeſtry, publiſhed in the collections of prints, was a ſpecimen of the labours of this academy.

At length they undertook to compoſe, by means of medals, a connected hiſtory of the principal events of Lewis XIV's reign. This was an ample field of matter, but very great difficulties attended the execution. The ancients, of whom there are ſo many medals remaining, have left us no other rules than the medals themſelves, which had hardly before that time been conſidered, except for the ſake of the beauty of the impreſſion, or ſtudied only for the attainment of hiſtorical knowledge. The moderns, who had, during the two laſt centuries, ſtruck a great many medals, had given themſelves but little trouble about rules, having neither followed nor preſcribed any. Beſides, it was difficult to find, in the collections of this ſort, three or four pieces, where genius had, with any ſucceſs, ſupplied the deficiency of method.

This academy was alſo directed to cauſe the plans and principal views of the royal houſes to be engraved, together with the deſcriptions of them. Theſe were very far advanced, and the deſcriptions almoſt all drawn up, when M. Colbert died.

They were likewiſe ordered to cauſe the plans and views of conquered places to be engraved, and to add thereto an hiſtory of each town and conqueſt; but neither this project nor the former has been ſince purſued. M. Colbert died in the year 1683, and was ſucceeded by M. de Louvois in the poſt of ſuperintendant of the buildings That miniſter, knowing that the abbé Tallemont had orders to prepare the inſcriptions ordered to be placed under the pictures of the gallery at Verſailles, and that he intended they ſhould appear upon the king's return, ſent for him immediately, to Fontainebleau, where the court then reſided, in order to inform him exactly of the preſent ſtate of things. The abbé Tallemont accordingly gave him the account, and ſhewed him the inſcriptions, which were all ready. Theſe inſcriptions were accordingly placed in the palace of Verſailles; but they have ſince undergone ſeveral alterations.

M. de la Chapelle being made comptroller of the buildings after M. Perrault, was directed to be preſent at the meetings of this academy, in order to write down their deliberations, and thereby became the fifth academician. Soon after that, M. de Louvois added to them two other academicians, viz. M. Racine and M. Deſpreaux, whoſe aſſiſtance he thought would be very neceſſary to the academy, in preparing the medallic hiſtory. At length M. Rainſant, who was a gentleman well verſed in the knowledge of medals, and director of the king's cabinet of antiquities, made the eighth academician.

They now, with great ardour, reſumed the medallic hiſtory, which had been interrupted during the laſt years of M. Colbert. They ſtruck ſeveral of different ſizes, and moſt of them larger than thoſe coined ſince: for which reaſon they are now called *medals of the great hiſtory*.

In the year 1691, the king gave the inſpection of the academy to M. de Pontchartrain, comptroller-general, ſecretary of ſtate, ſuperintendant to the king's houſehold, and afterwards chancellor of France. This gentleman, who had a taſte for literature, gave particular attention to this little academy, which was now generally known by the name of the *Royal Academy of Medals and Inſcriptions.* He fixed their meetings on Tueſdays and Saturdays.

The medals were now carefully reviewed; a great number added; all of them were reduced to one ſize; and the hiſtory brought down to the advancement of the duke of Anjou to the crown of Spain.

The eſtabliſhment of the academy of inſcriptions could not fail of having a place in this celebrated work, wherein none of the academies had been forgot. The medal on this ſubject repreſents Mercury ſitting and writing with an antique ſtylus upon a table of braſs; he leans with his left hand upon an urn full of medals, and at his feet are ſeveral others placed upon a card. Legend, *Rerum geſtarum fides*, and on the exergue, *academia regia inſcriptionum et numiſmatum inſtituta*, M.DC.LXIII. ſignifying, that the royal academy of medals and inſcriptions, founded in 1663, ought to give, to future ages, a faithful teſtimony of all great actions.

Soon after the publication of the medallic hiſtory, the academy received a new regulation, bearing date the 16th of July, 1701. It is now compoſed of *ten honorary members*, *ten penſionaries*, *ten aſſociates*, each of whom has two declarative voices, and *ten eleves*, or *pupils*. They meet every Tueſday and Wedneſday in one of the halls of the Louvre, and have two public meetings yearly, one on the day after Martinmas, and the other on the 16th after Eaſter. Its vacations are the ſame as thoſe of the academy of ſciences. They have ſome correſponding aſſociates, who may be either inhabitants of France, or foreigners. They have likewiſe a preſident and vice-preſident, choſen out of the honorary members, and a director and ſub-director taken out of the penſionaries.

The claſs of eleves has been ſince ſuppreſſed and united to the aſſociates. The ſecretary and treaſurer are perpetual; and the academy, ſince its revival in 1701, has publiſhed ſeveral volumes; theſe contain, excluſive of ſuch memoirs as are thought proper to be publiſhed intire, extracts made by the ſecretary from ſeveral others, and the eulogies on the deceaſed members. The preſident Darcy de Noinville, about ſix and twenty years ago, founded a literary prize, conſiſting of a gold medal of the value of 400 livres, which is every year diſtributed by the academy. The motto of the academy is, *Vetat mori*.

Royal ACADEMY *of Sciences*. This academy was eſtabliſhed in the year 1666, by the care of M. Colbert. Lewis XIV. after the peace of the Pyrennees, being deſirous of eſtabliſhing the arts, ſciences, and literature, upon a ſolid foundation, directed M. Colbert to form a ſociety of men of known abilities and experience in the different branches of literature and ſcience, who ſhould meet together under the king's protection, and communicate their reſpective diſcoveries. M. Colbert, having conferred on this ſubject with thoſe who were moſt celebrated for their learning, reſolved to form a ſociety of ſuch perſons as were converſant in natural philoſophy and mathematics, to join them to other perſons of ſkill in hiſtory and other branches of erudition, and to add ſuch as were entirely engaged in what are peculiarly called the Belles-Lettres, grammar, eloquence, and poetry. It was ordered that the geometricians, and natural philoſophers, ſhould meet on Tueſdays and Saturdays, in a great hall of the king's library, in which were contained the books of mathematics and natural philoſophy: that the learned in hiſtory ſhould aſſemble on Mondays and Thurſdays, in the hall wherein the books of hiſtory were depoſited; and, laſtly, that the claſs of Belles-Lettres ſhould aſſemble on Wedneſdays and Fridays; and that all the different claſſes ſhould meet together upon the firſt Thurſday in every month; and, by their reſpective ſecretaries, make a report of the proceedings of the foregoing month.

But an academy of this kind could not long ſubſiſt upon ſuch a footing; and, therefore, the claſſes of Belles-Lettres and hiſtory were reunited to the French academy; ſo that there only remained the claſſes of natural philoſophy and mathematics. The mathematical claſs was compoſed of Meſſ. Carcavy, Huyghens, de Roberval, Frenicle, Auzout, Picard, and Buot; and the natural philoſophers were Meſſ. de la Chambre, his majeſty's phyſician in ordinary; Perrault, Duclos, and Bourdelin, chymiſts; Pequet and Gayen, anatomiſts; Merchant, a botaniſt; and Duhamel, their ſecretary.

Theſe learned men, as well as their ſucceſſors, have publiſhed ſeveral excellent works for the advancement of the ſciences; beſides which, the academy, in the years 1692 and 1693, publiſhed every month ſeveral ſeparate tracts, which had been read at their meetings during the courſe of thoſe years.

In 1696, the abbé Bignon, who had long preſided in the academy of ſciences, thought it might be rendered of greater utility by giving it a new form. This he mentioned to his uncle the chancellor Pontchartrain; and the academy, at the beginning of that year, received a new regulation, which entirely altered the firſt form. By this regulation, the academy is compoſed of ten honorary members, one of whom muſt be the preſident, twenty penſioners, three geometricians, three aſtronomers, three mechanics, three anatomiſts, three botaniſts, three chemiſts, a treaſurer and a ſecretary, who are both perpetual; twenty aſſociates, twelve of whom muſt be inhabitants of France, two geometricians, two aſtronomers, &c. eight foreigners; and twenty eleves, each of whom is attached to one of the penſionary academiſts.

The honorary and penſionary members alone have deliberative voices when elections, or other affairs relating to the academy, are upon the tapis: but, when any thing relative to ſcience is treated of, the aſſociates are joined with them; the eleves are not to ſpeak, except called upon by the preſident.

The honorary members muſt be inhabitants of France, and well verſed in mathematics and natural philoſophy. In this claſs only regulars or religious are to be admitted.

No member can be admitted a penſionary, unleſs well known on account of ſome conſiderable work, important diſcovery, or remarkable courſe of ſtudy.

Every penſionary member is obliged to declare, at the beginning of the year, what work he intends to proſecute that year. Beſides this, the penſionaries and aſſociates are obliged, in their turns, to produce ſome obſervations and memoirs. The aſſemblies are held on Wedneſdays and Saturdays, unleſs either of them happens to be a holiday, and then the aſſembly is to be held on the preceding day.

In the year 1716, the duke of Orleans, then regent of the kingdom, thought proper to make ſome alterations in this regulation; and accordingly the claſs of eleves was ſuppreſſed, it appearing to be attended with ſome inconveniences, particularly that of making too great an inequality among the academiſts, and being productive of ſome animoſities and miſunderſtandings among the members. At the ſame time he created two other claſſes, one conſiſting of twelve adjuncts, who, as well as the aſſociates, were allowed a deliberative voice in matters relative to ſcience; and the other of ſix free aſſociates, who are not attached to any particular ſcience, nor obliged to purſue any particular work.

This academy, ſince its re-eſtabliſhment in 1699, has been very exact in publiſhing every year a volume, containing either the works of its own members, or ſuch memoirs as have been compoſed and read to the academy during the courſe of that year. To each volume is prefixed the hiſtory of the academy, or an extract of the memoirs, and, in general, of whatever has been read or ſaid in the academy: at the end of the hiſtory are the elogiums on ſuch academics as have died in the courſe of that year.

The late M. Rouillé de Meſlay, counſellor to the parliament of Paris, founded two prizes, one of 2500, and the other of 2000 livres, which are diſtributed by the academy alternately every year; the ſubjects for the firſt muſt relate to phyſical aſtronomy, and thoſe for the latter to navigation and commerce.

The academy has for its motto, *Invenit et perficit.*

Beſides theſe academies eſtabliſhed in the capital, there are many others in the provinces, particularly at Thoulouſe, Bourdeaux, Soiſſons, Marſeilles, Lyons, Pau, Montauban, Angiers, Amiens, Villefranche, &c.

Royal ACADEMY *of Sciences and Belles Lettres of Pruſſia.* This academy was eſtabliſhed by Frederic I. king of Pruſſia, in the year 1700, and M. Leibnitz appointed the firſt preſident when the liſt of the members was adorned with ſome of the greateſt names in the republic of letters. This academy, in the year 1710, publiſhed the firſt volume of its tranſactions, under the title of *Miſcellanea Berolinenſia*; and though Frederic's ſucceſſor gave but little encouragement to letters, the academy continued to publiſh new volumes in the years 1723, 1727, 1734, and 1740. At length Frederic III. the preſent king of Pruſſia, thought proper to give new vigour to the academy; and accordingly invited to Berlin ſuch foreigners as were of the moſt diſtinguiſhed merit in literature, and encouraged his ſubjects to proſecute the ſtudy and cultivation of the ſciences, by giving ample rewards; ſo that, in the year 1743, there appeared a new volume of the *Miſcellanea Berolinenſia*, in which the additional force the academy had acquired plainly appeared. However, that prince did not think fit to confine himſelf there: he thought that the royal academy of ſciences of Pruſſia, in which, till that time, ſome miniſter or opulent nobleman had preſided, would find an advantage from having a man of letters at its head, and accordingly conferred that honour on M. Maupertuis, a gentleman well known in every part of Europe. At the ſame time the king gave a new regulation to the academy, and took upon him the title of its protector. This academy has, ſince the year 1743, publiſhed thirteen volumes of memoirs, wrote in French, and nearly upon the ſame plan as the hiſtory of the Royal Academy of Sciences at Paris; but with this difference, that, in the ſecond of theſe volumes, the extracts of the memoirs are ſuppreſſed, as they are intended to be in the future volumes, one of which they propoſe to publiſh every year. The academiſts hold two public aſſemblies annually; one in January, on the preſent king's birth-day; and the other in May, on the day of his acceſſion to the throne. At the latter of theſe aſſemblies is given as a prize a gold medal of fifty ducats value; the ſubject for this prize is ſucceſſively natural philoſophy, mathematics, metaphyſics, and erudition: for the academy has this in particular, that it includes metaphyſics, logic, and morality, which are not the objects of any other; there being in this academy a particular claſs engaged in metaphyſical diſquiſitions, called the claſs of ſpeculative philoſophy.

Imperial ACADEMY *of Peterſburg.* The Czar Peter I. ſirnamed the Great, by whoſe means Ruſſia ſhook off the yoke of barbariſm, which had reigned ſo many ages in that kingdom, coming into England and France in the year 1717, and obſerving the great utility of literary ſocieties and academies, reſolved to eſtabliſh one in his capital; and had actually taken the neceſſary meaſures for that purpoſe, when death put a period to his life in the year 1725. His ſucceſſor, the Czarina Catherine, being fully informed of his intentions, laboured upon the ſame plan, and in a ſhort time formed one of the moſt celebrated academies in Europe, compoſed of the moſt conſiderable foreigners, ſome of whom ſettled at Peterſburg. This academy, which is employed in cultivating the ſciences and polite literature, hath, ſince the year 1726, publiſhed thirteen volumes of memoirs, wrote in Latin, and are highly valuable, particularly for the mathematical part, which contains a great number of excellent pieces. Moſt of the foreigners who compoſed that academy being either dead or retired out of the kingdom, it was in a very languiſhing condition when the Czarina Elizabeth aſcended the Ruſſian throne: but that princeſs, happily for herſelf, named count Raſomowſki preſident; who gave the academy a new body of ſtatutes, and left nothing neglected which could re-eſtabliſh its ancient ſplendor. This academy has this modeſt motto, *Paulatim.*

Royal Spaniſh ACADEMY is an academy for cultivating the Caſtilian tongue, eſtabliſhed at Madrid, on the model of the French academy. The deſign of this ſociety was laid by the duke d'Eſcalona, and approved of by the king in 1714, who declared himſelf its protector. It conſiſts of twenty-four academiſts, including the director and ſecretary. Its device is a crucible on the fire, with this motto, *Limpia fija y da eſplendor.*

ACADEMY *of Naturæ curioſi*, in Germany, was firſt founded in 1652, by M. Bauſch, a phyſician, and taken, in 1670, under the protection of the emperor Leopold.

Italy alone has more academies of note than all the reſt of the world; not a city but furniſhes a ſet of learned perſons for an academy, which to them ſeems an eſſential part of a regular conſtitution. Jarckius has given us a ſpecimen of their hiſtory, printed at Leipſic in 1725.

Jarckius's account goes no farther than to the academies of Piedmont, Ferrara, and Milan; in which laſt city he reckons twenty-five; but adds a liſt of all the reſt, to the number of five hundred and fifty.

ACADEMY *of Painting* is a public ſchool to which the painters reſort, either to draw or paint, and where the ſculptors model after a naked perſon, which they call a model.

The royal academy of painting and ſculpture at Paris, took its riſe from the diſputes that happened among the maſter-painters and ſculptors in that capital. This induced Le Brun, Sarazin, Corneille, and others of the king's painters, to form the deſign of a particular academy; and, having preſented a petition to the king, they obtained an arret, dated the 20th of January 1648. Their meetings were at firſt held in the apartments of M. Charmois, ſecretary to the marſhal Schomberg, who drew up the firſt body of ſtatutes for the academy.

Afterwards the academy conferred in the houſe of a friend of M. Charmois, ſituate near St. Euſtachius's;

from whence they removed to the hotel de Cliſſon, where they continued their exerciſes till the year 1653, when the academiſts removed into the ſtreet des Dechargeurs. In the year 1654, and towards the beginning of 1655, they obtained from cardinal Mazarin a brevet and letters patent, which were regiſtered in parliament; and, in grateful acknowledgment for this favour, they choſe the cardinal for their protector, and the chancellor for their vice-protector.

It is remarkable, that the chancellor had, from the firſt inſtitution of the academy, been named its protector; but, in order to make his court to cardinal Mazarin, he declined that title, and contented himſelf with that of vice-protector.

In the year 1656, Sarazin granted to the academy an apartment, which he at that time had in the galleries of the Louvre; but they were obliged to quit it in the year 1661: and M. de Ratabon, ſuperintendant of the buildings, removed them to the Palais-royal, where they remained one and thirty years. At laſt the king gave them an apartment in the Old Louvre.

In the year 1663, the academy obtained, by means of M. Colbert, a penſion of 4000 livres.

This academy conſiſts of a protector, a vice-protector, a director, a chancellor, four rectors, adjuncts to the rectors, a treaſurer, forty profeſſors, one of which is profeſſor of anatomy, and another of geometry; ſeveral adjuncts and counſellors, a ſecretary and hiſtoriographer, and two uſhers.

The academy of painting holds a public aſſembly every day for two hours, after noon, to which the painters reſort, either to deſign or paint; and where the ſculptors model after a naked perſon. There are twelve profeſſors, each of whom keeps the ſchool for a month; and there are twelve adjuncts to ſupply them in caſe of need. The profeſſor, upon duty, places the naked man, who is called the model, in ſuch a poſition as he thinks proper, and ſets him in two different attitudes every week: this is what they call ſetting the model. In one week of the month he ſets two models together, which is what they call ſetting the group. The paintings and models made after this model, as well as the copies made from them, are called academies, or academy figures. They have likewiſe a woman who ſtands for a model in the public ſchool. Every three months, three prizes for deſign are diſtributed among the eleves or diſciples, as are two others for painting, and two for ſculpture, every year. Thoſe who gain the prizes of painting and ſculpture are ſent to Rome, at the king's expence, to ſtudy there and compleat themſelves in their art.

Beſides the royal academy, there are two other ſchools, or academies, of painting in Paris; one whereof is at the royal manufacture of the Gobelins: this ſchool is under the direction of artiſts, to whom the king allows an apartment in the royal hotel of the Gobelins, and who generally are members of the royal academy. The other is the academy of St. Luke, which is maintained by the company of maſter-painters and ſculptors, and was eſtabliſhed by the provoſt of Paris, on the 12th of Auguſt 1391. Charles VII. in the year 1430, granted to it ſeveral privileges, which were confirmed in the year 1584, by Henry III. and, in 1613, the companies of painters and ſculptors were united. This company hath at preſent a houſe near St. Denis de la Chartré, where their office is held; and a public academy carried on in the ſame manner as the royal academy, and where they every year diſtribute, among their diſciples, three prizes for deſigns. —The only academy we have in England of this kind is in St. Martin's-Lane, London.

Academy *of Architecture*, a company of ſkilful architects, eſtabliſhed at Paris in the year 1671, by M. Colbert, under the direction of the ſuperintendant of the buildings.

Academy is alſo uſed in ſpeaking of the ſchools and ſeminaries of the Jews, where their rabbins and doctors inſtructed the youth of their nation in the Hebrew language, and explained to them the Talmud and the ſecrets of the Cabala. The Jews have always had theſe ſort of academies ever ſince their return from Babylon: thoſe of Tiberias and Babylon have been the moſt celebrated.

Academy is alſo particularly underſtood of a riding-ſchool, or place where young gentlemen are taught to ride the great horſe; as alſo the uſe of arms, dancing, vaulting, &c. This is what Vitruvius calls ephebeum; and ſome others, among the ancients, gymnaſium; the moderns call it equeſtrian, or military academy.

The duke of Newcaſtle will have the art of riding to have had its origin in Italy; and the firſt academy of this ſort to have been eſtabliſhed at Naples, by Frederic Griſon, who, he adds, was the firſt that wrote on this ſubject, which he did, like a true cavalier and a good maſter. Henry VIII. ſays the ſame author, called over two Italians, diſciples of Griſon, into England, who ſoon ſtocked the nation with ecuyers, or riding-maſters.

He adds, that the greateſt maſter which Italy ever produced, was a Neapolitan, called Pignatelli; that La Broue rid under him five years, Pluvinel nine, and S. Antoine many years; and that theſe Frenchmen filled France with French maſters, which, till then, had known only Italians.

The ground, ſet apart in an academy for riding, is called the manege, having uſually a pillar in the centre, and other pillars placed two by two at the ſides.

Academy *Figures*, in painting, are deſigns made after a model with a crayon or pencil.

ACAJA, in botany, a tree growing naturally in Brazil to the height of a lime; its bark is rough, and of a light aſh colour, like elder; the leaves, which are ſmooth, gloſſy, and ſhining, are placed oppoſite to each other, of unequal ſizes, but in general about four fingers in length, and a finger and a half or two fingers broad, with a broad nerve running the whole length of them. This tree bears yellowiſh flowers, which are ſucceeded by plums, not unlike ours in figure and magnitude, of a yellowiſh colour, and an acid taſte, each containing a ligneous ſtone, which is eaſily cracked, and incloſes a kernel of a yellowiſh-white colour. Its wood is red, and as light as cork.

ACAJOU, *the Caſſu, or Caſhew Nut-Tree*, in botany, a kind of plant producing a monopetalous flower, in the ſhape of a funnel, and divided into ſegments; out of the calyx ariſes a piſtillum, ſurrounded with threads, or ſtamina, faſtened to an oviary at the bottom of the flower: this oviary afterwards becomes a ſoft fruit, at the extremity whereof is a capſule, in the form of a kidney, incloſing a ſeed of the ſame form.

The acajou grows every where in Malabar, though it is a native of Brazil. They make a drink of the juice of this tree, which inebriates like wine. The kernel of the nut, when roaſted, is very good to eat; but the ſhell is ſo acrimonious, that it excoriates the gums, in caſe you attempt to bite it.

The dyers uſe the oil which they expreſs from the ſhells of the nut of this tree, in dying a black colour. The inhabitants of Brazil reckon their age by means of thoſe nuts, for which purpoſe they lay up one of them every year.

ACAMATOS, a word uſed to denote the beſt conſtitution and ſhape of the human body.

ACAMECH, among ſome of the old chymiſts and minerologiſts, is uſed to denote the ſcoria of ſilver, as alſo a ſuperfluity of the humidum radicale in that metal.

ACANACEÆ, in botany, all thiſtles that are prickly and have heads, are ſo called.

ACANGIS, i. e. *ravagers or adventurers in queſt of fortune*; a name given by the Turks to their huſſars, who, like ours, are light troops, fitter for ſkirmiſhing and pillaging, than to engage with regular troops in an action; they are generally ſent out in detachments to get intelligence, harraſs the enemy, attack convoys, and ravage the country.

ACANTHA, in botany, a name given to prickly or thorny plants.

The word is Greek, and ſignifies a thorn.

Acantha, in anatomy, ſignifies the protuberances of the back-bone, commonly called *ſpinæ dorſi*.

ACANTHACEOUS, an epithet applied by botaniſts to plants of the prickly kind.

The word is formed from the Greek, *ακανθα*, a thorn.

ACANTHABOBES, in ſurgery, a kind of forceps uſed in extracting of thorns, ſplinters, &c.

The word is compounded of the Greek, ακανθος, a thorn, and βαλλω, to caſt out, or extract.

ACANTHUS, in botany, a plant producing an irregular, monopetalous flower, terminated in a ring at the bottom: the anterior parts, and the poſterior, are in the ſhape of a ring. The place of the upper lip is filled with ſtamina, whoſe ſummits are like a bruſh; out of the calyx proceeds a piſtil, which is inſerted into the oviary at the bottom of the flower, and becomes a fruit in the ſhape of an acorn, which is enveloped by the calyx; this fruit is divided by a partition into two cells, each containing ſeeds, which are commonly of an irregular figure.

The leaves of this plant, when freſh gathered, yielded by analyſis a phlegm which had neither ſmell nor taſte, but was impregnated with a little blackiſh ſalt that rendered a ſolution of lead turbid; a liquor which at firſt inclined to an acid, and afterwards became clearly ſo, and at the ſame time a little alkaline; a reddiſh empyreumatic liquor, lightly acid, but replete with an urinous alkaline ſalt, a great deal of volatile ſalt, and an oil, neither very fluid nor very thick. The black maſs that remained in the retort, being calcined in a reverberating heat, yielded a whitiſh aſh, from which a fixed ſalt, merely alkaline, was extracted by lixiviation; from this analyſis, the relative quantity of principles extracted from it, and the viſcoſity of the plant, it appears that it contains a good deal of ſal ammoniac, and a little oil diluted in a large quantity of phlegm. They only uſe the leaves in lotions, fomentations, and cataplaſms.

Botaniſts diſtinguiſh five ſpecies of acanthus. This plant is called in Engliſh, brank urſine, bear's breech, or bear's foot.

Acanthus, in architecture, an ornament reſembling two ſpecies of plants of the ſame name, one of which is wild, and the other cultivated in gardens. The firſt is called in Greek acantha, which ſignifies a thorn; and is that which the major part of the Gothic ſculptors have imitated in their ornaments. The ſecond is called in Latin branca urſina, becauſe they pretend that it reſembles a bear's foot. The ancient and modern ſculptors have preferred the latter, and made uſe of it particularly in their capitals. Vitruvius ſays, that this plant gave occaſion to Callimachus, the Grecian ſculptor, to compoſe the Corinthian capital. See Capital.

ACARA, a ſmall Braſilian fiſh, about three inches in length, and its body reſembling that of a perch. The mouth is narrow, and the jaws as rough as a file. The eyes are not large, but have a golden circle, and the back fins connected together. The tail is oblong, and the ſcales are pretty large, of a ſilver colour, but on the head, back, and ſides, they are mixed with umber. In the middle of each ſide there is a large black ſpot, as alſo near the root of the tail. It is a river fiſh, and keeps conſtantly in freſh water. *Brookes's Natural Hiſtory.*

ACARA-AYA, a fiſh, found plentifully on the coaſt of Braſil. It is three feet in length, and is of the ſhape of a carp. The teeth are ſharp and ſmall, but there are two more long and thick on the upper jaw. The eyes are large, with a blood-red circle without, and ſilver-coloured within. The fins are as in the former, and the tail is broad, and almoſt divided into two horns. The ſcales are middle ſized, and of a ſilver colour, ſhaded with another of the colour of blood. The belly is entirely white; but all the fins are of a blood colour, except ſome part of the belly fins, which are white; but their exrtemities are of the former colour. *Brookes's Natural Hiſtory.*

ACARA-MUCA, the name of a remarkable fiſh, about ſix inches long and two broad, furniſhed with triangular teeth. Juſt behind the eyes, on the ridge of the back, ſtands a ſlender pointed horn, of a cylindrical ſhape, and two inches long. It is found on the coaſt of Braſil; but never eaten.

ACARA-PEBA, a ſmall Braſilian fiſh, about a foot long, and four or five inches broad. Its mouth is large, but without teeth, and its tail forked. It ſeems to be a ſpecies of the ſmaris.

ACARA-PITOMBA, a beautiful Braſilian fiſh, reſembling our mullet, and near two feet in length. Its tail terminates in two oblique horns. Along the middle of each ſide runs a broad and beautiful gold-coloured line, from the gills to the tail. Its back alſo down to this line is variegated with ſpots of the ſame colour; while its ſides below that line are decorated with ſhort longitudinal lines of a ſomewhat paler colour. Its belly is white, and its fins yellow.

AGARA-PUCA, a river fiſh found in Braſil, half a yard in length, and four or five inches broad. The ſnout is ſharp at the end, and the mouth is without teeth. The eyes are large, with an iris mixed with white and brown. Every part ſhines with ſmall ſcales of a ſilver-colour, only on the back there is a little mixture of gold. On each ſide there are ſix oblong bluiſh red ſpots, which are not very conſpicuous, and the back-fins, as well as the tail, are of a light blue, and ſo are the ſide-fins. There are two at the bottom of the belly, which, with thoſe near the vent, are a little yellowiſh. *Brookes's Natural Hiſtory.*

ACARAUNA, a Braſilian fiſh, covered with blackiſh ſcales. The tail is forked, and on the length of the whole back, as alſo on the bottom of the belly, there runs a ſharp fin, which towards the hinder part, is about an inch broad. The mouth is ſmall, narrow, and furniſhed with exceeding ſmall teeth; and, on each ſide near the tail, there is a ſharp ſpine or prickle, almoſt an inch long, which he can conceal in his ſide, or thruſt out ſo as to wound other fiſh.

The ſquare Acarauna, a Braſilian fiſh, called by ſailors, the Old Wife. It differs in many things from the former: for the fore part of the body is of a ſtraw-colour, and the latter brown; beſides, the ſcales run parallel to each other; and, on both ſides the upper jaw, there are four ſpines or prickles; and on the lower two ſpikes, which are ſtiff, ſharp, and an inch in length, like a cock's ſpurs, turning obliquely downward. There is a black fin which runs from the head to the tail, and another on the belly, which proceeds from the vent to the ſame place, being parallel to each other, the fiſh being of a ſquariſh ſhape.

The ſmall Black Acarauna is beautifully painted with yellow belts. It differs little from the former, except in the belts, which are of an iron-grey-colour, and are ſomewhat differently placed; beſides, in theſe there are no viſible ſcales. *Brookes's Natural Hiſtory.*

ACARI, the name of inſects that breed under the ſkin. Ariſtotle calls the ſmall inſects that breed in wax by the ſame name.

ACARICABA, in botany, a Braſilian plant, whoſe roots are aromatic, and may be placed in the firſt claſs of aperitives.

ACARUS, the ſame with Acari. See Acari.

ACARON, the name of the god of flies. The Ekronites called him Baalzebub.

Acaron, in botany, wild myrtle or butcher's broom. It is principally uſed in obſtructions of the liver, &c.

ACATALECTIC, in ancient poetry, ſignifies complete verſes, or ſuch as have all their feet and ſyllables, and are not lame or defective at the end.

The word is compounded of the Greek α priv. κατα, and ληγω, to end, q. d. that wants nothing at the end.

ACATALEPSY, among the ancient philoſophers, implied the impoſſibility of conceiving or comprehending a thing.

The word is Greek, and compounded of α priv. and καταλαμβανω, to diſcover.

ACATASTATOS, a term uſed by the ancient phyſicians to ſignify irregular fevers, where paroxyſms are uncertain, and the appearance of the urine perpetually changing.

The word is Greek, and compounded of α priv. and καθιστημι, to be fixed.

ACATERY, an officer in the king's houſhold, deſigned as a cheque between the clerks of the kitchen and the purveyors.

ACATIUM, a ſort of boat, or pinnace, very ſharp at the head, uſed by the ancients in military affairs.

The word is Greek, ακατιον, from ακη, a point.

ACAULIS, in botany, a term applied to plants, whoſe flowers reſt on the ground, having no caulis or ſtalk.

The word is Latin, and compounded of *a* neg. and *caulis*, a ſtalk.

ACBAB, the name of a bird reſembling our common hen, frequently found wild in the Philippine iſlands.

ACCA-LARENTIA, a pagan goddeſs of the Romans. She was the wife of Fauſtulus, ſhepherd to king Numitor, and nurſe of Romulus and Remus. Romulus, out of gratitude, decreed her divine honours after her death, and appointed a feſtival, called from her Larentalia; which was celebrated, according to Varro, in April; but, according to Ovid, in December.

ACCEDAS *ad curiam*, in law, a writ which lies for him who has received falſe judgment, or fears partiality in a court-baron, or a hundred court. It is directed to the ſheriff, and iſſued out of chancery; but returnable into the king's-bench, or common pleas. In the regiſter of writs, it is ſaid to be a writ which lies as well for judgment delayed, as for falſe judgment; and that it is a ſpecies of writ, *Recordare*, the ſheriff being obliged to make record of the ſuit in the inferior court, and certify it into the king's court.

ACCEDAS *ad vicecomitem* is a writ directed to the coroner, commanding him to deliver a writ to the ſheriff, who having a *pone* delivered to him ſuppreſſes it.

ACCELERATED implies, in a general ſenſe, quickened, continually increaſing. Thus, accelerated motion is a motion continually increaſing.

The word is Latin, *acceleratus*, compounded of *ad*, to, and *celer*, ſwift.

ACCELERATED *Motion*, in mechanics, is that whoſe velocity is conſtantly increaſed; and, if the acceſſions of velocity be equal in equal times, the motion is ſaid to be uniformly accelerated. This comes chiefly under conſideration, in the deſcent of heavy bodies, by the force of gravity. See MOTION, CENTER, and VELOCITY.

The acceleration of falling bodies, though a moſt obvious and indiſputable fact, yet various are the ſyſtems and opinions which philoſophers have produced to account for it: ſome have aſcribed it to the preſſure of the air: the farther, ſay they, a body falls, the greater weight of atmoſphere is of conſequence incumbent on it, and the preſſure of a fluid is proportional to the perpendicular altitude thereof; to which they add, that the whole body of the fluid preſſing in innumerable right lines, all alternately meeting in the earth's center, that point muſt ſuſtain, as it were, the preſſure of the whole maſs, conſequently the nearer a body approaches thereto, the more muſt it receive of the preſſure of a multitude of lines tending to unite in the central point. Others inſiſt, that the incumbent air is the groſſer and vaporous the nearer the earth, and filled with more heterogeneous particles, which are not true elaſtic air; and hence, ſay they, a deſcending body, meeting continually with leſs reſiſtance from the elaſticity of the air, and having the ſame force of gravity ſtill acting on it, muſt neceſſarily be *accelerated*. Hobbs endeavours to account for this *acceleration*, from a new impreſſion of the cauſe which makes bodies to fall, which, on his principles, is alſo the air. As part of this aſcends, part alſo muſt deſcend, for reaſons drawn from the motion of the earth, which is compounded of two motions, one circular, and the other progreſſive, conſequently the air aſcends, and circulates at once. As the body, in its fall, receives a new preſſure in every point of its deſcent, its motion, he ſays, muſt needs be accelerated.

But to both theſe ſyſtems, it may be anſwered, that the air is quite out of the queſtion; for it is very evident that bodies fall, and in falling have their motion accelerated in *vacuo*, as in open air. See VACUUM.

The Gaſſendiſts aſſign another reaſon for the acceleration. They pretend that there are continually iſſuing out of the earth certain attractive corpuſcles, directed in an infinite number of rays; thoſe, they ſay, aſcend and then deſcend, in ſuch ſort, that the nearer a body approaches to the earth's center, the more of theſe attractive rays preſs upon it; in conſequence of which, its motion becomes more *accelerated*.

The Peripatetics account for this matter thus: the motion of heavy bodies downwards, ariſes out of an intrinſic principle, ſay they, which cauſes a tendency in them to the center, as the place appropriate to their element; where, when they can once arrive, they will be at perfect reſt; wherefore, continue they, the nearer bodies approach to it, the more the velocity of their motion is increaſed.

The Carteſians account for the *acceleration*, by the repeated impulſes of their *materia ſubtilis*, acting continually upon falling bodies, and propelling them downward.

After all, the cauſe of *acceleration* is nothing myſterious; the principle of gravitation, which determines the body to deſcend, determining it to be *accelerated* by a neceſſary conſequence. See GRAVITATION.

A body then having once begun to deſcend through the impulſe of gravity, that ſtate is now, by Sir Iſaac Newton's firſt law, become as it were natural to it, inſomuch that, were it left to itſelf, it would for ever continue to deſcend, even though the firſt cauſe of its deſcent ſhould ceaſe. But, beſides this determination to deſcend, impreſſed upon it by the firſt cauſe, which would be ſufficient to continue the degree of motion already began to infinity, new impulſes are continually ſuperadded by the ſame cauſe, which continue to act upon the body already in motion, in the ſame manner as if it had remained at reſt: there being then two cauſes of motion, acting both in the ſame direction, it neceſſarily follows, that the motion which they unitedly produce, muſt be more conſiderable than what either could produce ſeparately; and, as long as the velocity is thus increaſed, the ſame cauſe ſtill ſubſiſting to increaſe it yet more, the deſcent muſt of neceſſity be continually accelerated.

Suppoſing then that gravity, from whatever principle it proceeds, acts uniformly upon all bodies at the ſame diſtance from the center of the earth; dividing the time which the heavy body takes up in falling to the earth into infinitely ſmall equal parts, this gravity will impel the body towards the center of the earth, in the firſt infinitely ſhort inſtant of the deſcent. If, after this, we ſuppoſe the action of gravity to ceaſe, the body will continue perpetually to advance uniformly towards the earth's center, with an infinitely ſmall velocity, equal to that which reſulted from the firſt impulſe. But then, if we ſuppoſe that the action of gravity does continue in the ſecond inſtant, the body will receive a new impulſe towards the earth equal to that which it received in the firſt inſtant, conſequently its velocity will be doubled; in the third inſtant it will be tripled; in the fourth, quadrupled; and ſo on. For the impulſe made in any preceding inſtant, is no ways altered by that which is made in the following one; but they are accumulated on each other: wherefore, the inſtants of time being ſuppoſed infinitely ſmall, and all equal, the velocity acquired by the falling body will be in every inſtant, as the times from the beginning of the deſcent, and conſequently the velocity will be proportional to the time in which it is acquired.

Moreover, the ſpace run through by a moving body during a given time, and with a given velocity, may be conſidered as a rectangle compounded of the time and the velocity. Suppoſe A (plate I. *fig.* 6.) to be the heavy body which deſcends, A B the time of the deſcent, which let be divided into a certain number of equal parts, denominated intervals or proportions of the given time, as AC, CE, EG, &c. Imagine the body to deſcend, during the time expreſſed by the firſt of the diviſions AC, with a certain uniform velocity ariſing from the degree of gravity acting on it, this velocity will be repreſented by AD, and the ſpace run through by the rectangle CAD. Now the action of gravity having produced in the firſt moment, the velocity AD, in the body before at reſt; in the ſecond moment it will produce the velocity C F, the double of the former; in the third moment, to the velocity C F will be added one degree more, by which means will be produced the velocity E H, triple that of the firſt, and ſo of the reſt: ſo that during the whole time AB, the body will have acquired the velocity BK. After this, taking the diviſions of the line at pleaſure: for example, the diviſions AC, CE, &c. for the times; the ſpaces run through during thoſe times, will be as the areas or rectangles C D, E F, &c. So that the ſpace deſcribed by the moving body, during the whole time AB, will be equal to all the rectangles;

gles; that is to ſay, to the whole intended ſpace ACEGBKLHFD.

Thus it will happen if the increments of velocity be produced, as we may ſay, all at once, at the end of certain portions of finite time; for inſtance, at C, at E, &c. ſo that the degree of motion remains the ſame to the inſtant that a new acceleration takes place. By imagining ſhorter diviſions of time, for example, but half ſo long as the former, the indentures of the figure will be proportionably more contracted, and it will approach near unto a triangle: and, if they be taken infinitely ſmall; that is, if increments of the velocity be ſuppoſed to be acquired continually, and at each indiviſible particle of time, which is really the caſe, the rectangles ſo ſucceſſively produced will form a true triangle, as ABE; (plate I. *fig.* 7) the whole time AB conſiſting of minute portions of times, A 1, A 2, A 3, &c. and the area of the triangle ABE, of all the minute ſurfaces, or minute trapeziums, which anſwer to the diviſions of the times; the area of the whole triangle, expreſſing the ſpace run through during the time AB: or the triangles ABE, A 1 *f* being ſimilar; their areas are to each other as the ſquare of their homologous ſides AB, A 1, &c. and conſequently the ſpaces gone through, are to each other as the ſquares of the times.

Whence alſo may be deduced this great law of acceleration: *That a body deſcending with an uniformly accelerated motion, deſcribes in the whole time of its deſcent a ſpace which is exactly the half of that which it would deſcribe uniformly in the ſame time with the velocity it acquires at the end of its fall.* For, as we have already ſhewn, the whole ſpace which the falling body has run through in the time AB, will be repreſented by the triangle ABE, and the ſpace that body would run through uniformly in the ſame time, with the velocity BE, will be repreſented by the rectangle ABEF. But it is well known that the triangle is exactly equal to half the rectangle: ſo that the ſpace run through, will be the half of that which the body would deſcribe uniformly in the ſame time with the velocity acquired at the end of its fall.

We may therefore conclude: 1ſt, That the ſpace which would be uniformly deſcribed in half the time AB, with the ultimately acquired velocity BE, is equal to that which has been actually run through by the falling body during the whole time AB.

2d. If the falling body deſcribes any given ſpace, or length, in a given time, in twice that time it will deſcribe four times as much; in thrice that time, nine times as much, &c. In a word, if the times are in proportion to each other, as the ſeries 1, 2, 3, 4, &c. the ſpaces run through will be as the ſquares of theſe numbers; that is, as 1, 4, 9, 16, &c. that is, if a body deſcribes, for example, 16 feet in the firſt ſecond of its fall, in the two firſt ſeconds taken together, it will deſcribe four times 16 feet, nine times 16 feet in the three firſt ſeconds taken together, and ſo on.

3d. The ſpaces deſcribed by falling bodies, in a ſeries of equal inſtants, or intervals of time, will be as the odd numbers 1, 3, 5, 7, 9, &c. that is, the body which has run through 16 feet in the firſt ſecond, will in the next ſecond run through 48 feet, in the third ſecond 80 feet, &c. And, ſince the velocities acquired in falling are as the times, the ſpaces will be likewiſe as the ſquares of the velocities, and the times, and the velocities, in the ſubduplicate ratios of the ſpaces.

The motion of an aſcending body, or of one that is impelled upwards, is diminiſhed or retarded by the ſame principle of gravity, acting in a contrary direction, after the ſame manner that a falling body is accelerated.

A body projected upwards, aſcends until it has loſt all its motion, which it does in the ſame interval of time that the ſame body would have taken up in acquiring by falling, a velocity equal to that with which the falling body began to be projected upwards: and conſequently the heights to which bodies projected upwards, with different velocities, arrive, are to each other as the ſquare of thoſe velocities.

Accelerated *Motion of Bodies upon inclined Planes*, in mechanics. Let two equal bodies deſcend by the force of gravity, from the point A, (plate I. *fig.* 8.) the one along the line AB, and the other along the line AC; when they are come to the points B, C, they will be got equally near to the earth's center: therefore the forces with which they are impelled, as they are both directed towards the earth's center, will be equal. But the intenſities of equal forces are reciprocally as the ſpaces gone through; and therefore, here, the intenſity of the force by which the body is impelled along the inclined plane, is to the intenſity by which it is impelled directly towards the center of the earth, as A to B. Therefore, a body incumbent on an inclined plane, loſes part of its gravity, and the weight acquired to ſuſtain it, is to the weight of the body, as AC, the height of the plane, to AB, the length of the ſame. As the force by which a body is made to deſcend along an inclined plane ariſes from gravity, it is of the ſame nature with it, and therefore that force every moment, and in all parts of it, is equal; conſequently the motion of a body freely deſcending along an inclined plane, is analogous to that of a body freely falling; and what has been ſaid of the latter holds good here, and conſequently the motion is equally accelerated in equal times.

The forces by which two bodies deſcend, one of which falls freely, and the other runs down an inclined plane, if they begin to fall at the ſame inſtant, are ever to one another in the ſame ratio as at the beginning of the fall; wherefore the effects of thoſe forces, that is, the ſpaces gone through in the ſame time, are in the ſame ratio, namely, that of the length of the plane to its perpendicular height.

In the plane AB, the ſpace gone through by a body, whilſt another falls freely down the height of the plane AC, (plate I. *fig* 9.) is determined by drawing CG perpendicular to AB; for then the length of the plane AB, is to its height AC, as AC to AG. If a circle be deſcribed with the diameter AC, the point G will be in the periphery of the circle; becauſe an angle in a ſemicircle, as AGC, is always a right one; and therefore a point, as G, taken in any inclination of the plane, will always be in the periphery of the ſaid circle. Whence it follows, that all the chords, as AG, are gone through by bodies running down them, in the time that a falling body would freely deſcend through the diameter AC, are equal. Through the point C there can be no chord drawn, as HC, but a chord A*g* may be parallel to it (that is equally inclined) and equal; therefore, in a ſemicircle, as AHC, whether a body falls freely along the diameter AC, or whether it falls along any chord as HC, it will in the ſame time arrive at the loweſt point C, of the ſemicircle. The time of the fall along the whole plane AB, may be compared with the time of the deſcent along the height AC; which, for that time, is equal to the time of the fall along AG, and ſo the ſquares of thoſe times are to one another, as AB to AG: but AB is to AC, as AC to AG; therefore the ſquares of the lines AB and AC, are to one another, as the times of the fall along AB and AG, or AC; that is, the times, in that caſe, are as the ſpaces gone through.

In the ſame caſe, the velocities at the end of the deſcent are equal; for, after equal times, when the bodies are at G and C, the velocities are in the ſame ratio as in the beginning of the fall, that is, as the forces by which the bodies are impelled, or as AC to AB. When the body deſcends from G to B, the velocity increaſes as the time; and the velocity at G is to the velocity at B, as AB to AB; therefore the velocities at B and C have the ſame ratio to the velocity at G, and ſo are equal. Hence it appears, that a body acquires the ſame velocity in falling from a certain height, whether it falls directly down, or along an inclined plane; and, ſince the angle of inclination cauſes no alteration, a body may run down ſeveral planes differently inclined, and even along a curve, which may be conſidered as made up of innumerable planes differently inclined; and the celerity acquired will always be the ſame when the height is equal. Upon this foundation the whole doctrine of pendulums is ſuperſtructed. See PENDULUM.

Accelerated *Motion of Pendulums.* See PENDULUM.

Accelerated *Motion of Projectiles.* See PROJECTILES.

Accelerated *Motion of compreſſed Bodies.* See Compression and Elasticity.

Acceleration, in philoſophy, implies an increaſe of velocity in the motion of a body; it is oppoſed to retardation, by which term is underſtood a diminution of velocity. See Motion, Velocity, and Retardation.

Acceleration, in aſtronomy, is the time whereby a fixed ſtar in one diurnal revolution anticipates the mean revolution of the ſun, being 3′, 56″, in one day.

ACCELERATIVE *Quantity of Centripetal Force*, in philoſophy, is the meaſure of the ſame, proportional to the velocity which it generates in a given time. If the central force be not conſidered as reſiding in the center, but at any diſtance from it, we may conceive ſpherical ſurfaces at various diſtances from the center, whoſe common center is T, (plate I. *fig.* 10.) and the central forces conſidered at thoſe diſtances, or ſpherical ſurfaces, is called the accelerative force, the quantity whereof will be proportional to the velocity which it generates in a conſtant and given time, in every one of the elements of the matter, which are equidiſtant from the center: for, ſuppoſing ſuch conſtant force continually to exert itſelf on the elements of the matter, it will be greater in proportion to the degree of velocity generated in a given time: ſo that if a double velocity be generated in an equal time, the force will likewiſe be double, ſince that velocity is the full effect of ſuch force. If the velocity generated by the accelerative force remains conſtant, the force will be in the inverſe ratio of the time wherein the velocity is generated; for, if the ſame velocity be produced in a ſubduple time, the force will be doubled: wherefore, if whilſt the force continues conſtant, the velocity and the time are varied, the accelerative force will be a ratio compounded of the direct ratio of the generated velocity, and of the reciprocal ratio of the time. If then the accelerative force be called G, the acquired velocity V, and the time in which it is acquired T; G will be $= \frac{V}{T}$, and $G \times T = V$, and $T = \frac{V}{G}$. Now, notwithſtanding the accelerative force varies, its meaſure is ever the ſame, provided the velocity be conſidered in a naſcent ſtate, or as generated in a very minute portion of time at the beginning of the motion; for then the force acts uniformly.

If any force be diffuſed by diverging rays, in a non-reſiſting medium, the accelerative force decreaſes in the duplicate ratio of the diſtances from the center: for ſince the force is, by ſuppoſition, propagated in a non-reſiſting medium, no ray is intercepted, nor the force of any of them diminiſhed, and conſequently the rays, which at the diſtance T L were propagated through the hemiſphere deſcribed by the ſemicircle P L C, at the diſtance T K, are propagated through the hemiſphere deſcribed by the ſemicircle E K H. Now the accelerative force is as the denſity of the rays, and the denſity of the rays is reciprocally as the ſurfaces of the hemiſpheres deſcribed by the ſemicircles: for the denſity of the rays is as the ſum or number of them divided by the ſurface which they occupy, ſuch ſum being at the maſs, and the occupied ſurface as the volume: but ſince, by ſuppoſition, the ſame number of rays is diffuſed over both hemiſpheres, their denſity will be in the inverſe ratio of the ſurfaces deſcribed at any diſtances from the center, and thoſe ſurfaces are in the duplicate ratio of the diſtances from the center; therefore the accelerative force is alſo in the duplicate ratio of the diſtances from the center reciprocally. From the demonſtration, it appears, that this theorem excludes all reſiſtance of the medium; wherefore, in phyſical matters, ſuch reſiſtance muſt be taken into the computus. Furthermore, this theory of forces or qualities propagated from a center, may be rendered more univerſal, by ſuppoſing the force to be variouſly propagated in the ſeveral rays, or even to be diffuſed along curve lines. See Centripetal Force.

ACCELERATORES *Urinæ*, in anatomy, two muſcles of the penis, whoſe principal office is to expedite the diſcharge of the urine and ſemen.

Authors have been miſtaken in aſſigning the origination of theſe muſcles, either to the ſpincter ani, or tubercles of the oſſa iſchii. They ariſe fleſhy from the ſuperior part of the urethra, as it paſſes under the *oſſa* pubis, and encompaſſing the external part of the bulb of its cavernous body, both muſcles meet on the inferior part, correſponding with the ſeam of the ſkin in the perinæum, and continue ſo united for the ſpace of about ſix inches; after which they ſeparate from each other, and aſcend to their inſertions on each ſide of the corpora cavernoſa penis.

Beſides the uſe commonly aſcribed to theſe muſcles, in compreſſing the urethra in the diſcharge of the urine, and promoting the ejaculation of the ſemen (which action is chiefly performed by the laſt deſcribed part of them embracing the urethra, as they paſs to their inſertions on each ſide the cavernous bodies of the penis); they alſo aſſiſt the erectores penis in their erection, by driving the blood contained in the bulb of the cavernous body of the urethra towards the glands in greater quantities, whereby it becomes diſtended, the veins, which carry the refluent blood from the corpus cavernoſum urethra, at that time being alſo compreſſed by the ſwelling of theſe muſcles. *Cooper.*

ACCENSI, in antiquity, were officers attending the Roman magiſtrates; their buſineſs was to ſummon the people to the public aſſemblies: they were alſo to aſſiſt the pretor when he ſat on the bench, and to give him notice every three hours what it was o'clock.

The word is Latin, and compounded of *ad*, and *cenſeo*, to reckon.

Accensi, in the Roman armies, were, according to Feſtus, ſupernumerary ſoldiers, whoſe office it was to attend their principals, and ſupply the places of thoſe who were killed or wounded. Livy mentions them as irregular troops, who were but little eſteemed. Salmaſius tells us, they were taken out of the fifth claſs of the poor citizens at Rome.

ACCENSION, in philoſophy, the act of kindling, or ſetting a body on fire.

The word is Latin, *accenſio*, and compounded of *ad*, and *candeo*, to ſhine.

ACCENT, an inflexion of the voice, giving to each ſyllable of a word its proper pitch with regard to height or lowneſs.

The word is Latin, *accentus*, compounded of *ad*, to, and *cano*, to ſing.

Accent, in grammar, is a certain mark or character placed over a ſyllable, to direct the manner of its pronunciation, and regulate the inflection of the voice in reading. We generally reckon three grammatical accents, viz. the acute, the grave, and the circumflex.

The Greeks ſeem to have been the firſt who introduced the uſe of accents in writing. The author of *La Methode Greque*, p. 546, obſerves, that the right pronunciation of the Greek language, being natural to the Greeks, it was needleſs for them to mark it by accents in their writings: ſo that, according to all appearance, they only began to make uſe of them ſo low as the time in which the Romans, being curious to learn the Greek tongue, ſent their children to ſtudy at Athens, thinking thereby to fix the pronunciation, and to facilitate it to ſtrangers, which happened, as the ſame author obſerves, a little before Cicero's time.

As to other matters, the only object of theſe accents of the Greeks were the inflections of the voice, ſo far as it may be either raiſed or lowered.

The acute accent, which was written from right to left, [´] ſhewed, that the voice ought to be raiſed in pronouncing that vowel on which it was marked. The grave accent, which was wrote thus [`] on the contrary, denoted that the voice ſhould be lowered. The circumflexed accent is compounded of the acute and grave, though in length of time the tranſcribers rounded it after this manner [˜]; but it is only uſed in the Greek. This accent was deſigned to give us to underſtand, that, after having firſt raiſed the voice, it ſhould be lowered upon the ſame ſyllable.

The Latins have made the ſame uſe of theſe three accents. That elevation and ſinking of the voice were more ſenſible among the ancients than among us, becauſe their pronunciation was more elevated and tuneful. However, we likewiſe have a riſing and lowering of the voice in our manner of ſpeaking, and that independently of the other words of the phraſe; ſo that the ſyllables of our words are raiſed or ſunk, according to the proſodic or tonic accent, independent of the pathetic, i. e. of the tone that paſſion and ſentiment gives to the whole phraſe; for it is the nature of every voice, ſays the author of *La Methode Greque*, p. 551, to have ſome elevation, which keeps up the pronunciation; and this elevation is afterwards moderated and diminiſhed, and is not laid upon the ſucceeding ſyllables.

This proſodic accent, which conſiſts only in the raiſing or ſinking of the voice in certain ſyllables, ought to be diſtinguiſhed from the pathetic tone, or the tone of the ſentiment.

Further, it is not cuſtomary with us to denote this elevation or ſinking of the voice by any ſigns or accents in our writing; our pronunciation is leſs kept up, and has leſs harmonious modulation in it than that of the ancients, and conſequently the modification, or tone of voice ſpoken of here, is leſs perceivable: habit ſtill augments the difficulty of unravelling theſe nice differences. The ancients pronounced, at leaſt their verſes, in ſuch a manner as enabled them to meaſure the length of ſyllables, by beating with their feet. *Adſuetam moram, pollicis ſonor vel plauſu pedis, diſcriminare, qui docent artem, ſolent*, (Terentianus Maurus de metris ſub. med.) which we cannot do but by ſinging. In a word, in all kinds of oratorical accents, whether in interrogating, in admiring, in paſſion, &c. the ſyllables which precede our *s* are ſuſtained and elevated in the ſame manner as they are in common diſcourſe.

This difference between the pronunciation of the ancients and ours, appears to be the true reaſon why, though we have a quantity as they had, yet the difference of our long and ſhort quantities not being equally ſenſible in all our words, our verſes are only formed by the harmony which reſults from the number of ſyllables: whereas the Greek and Latin verſes draw their harmony from the number of feet adapted by certain combinations of long and ſhort ſyllables.

The dactyle, iambic, and other feet, enter in common diſcourſe, ſays Cicero, and the hearer eaſily knows them; *Eos facile agnoſcit auditor.* Cic. Orat. n. lvi. "If "in our theatres, ſays he, an actor pronounces a ſyllable "ſhort or long, or with a grave or acute tone, other-"wiſe than as it ought to be pronounced, all the people "cry out againſt it. However, adds he, the people have "not ſtudied the rule of our proſodia, and only feel "themſelves offended by the actor's pronunciation; "but cannot explain how, or in what manner: in this "particular, there is no other rule but the diſcerning it "by ear; and with that help only, which cuſtom "and habit has given, they know the long and ſhort, "and diſtinguiſh the grave from the acute."

Accent, in rhetoric, implies a particular manner of expreſſion, and gives either a good or bad ſenſe to the words, according to the intention of the ſpeaker.

Accent alſo implies a certain inflection of the voice; or a peculiar tone and manner of pronunciation, contracted from the country, or province, where a perſon was bred.

Accent, in muſic, is a modulation of the voice to expreſs a paſſion. See Music.

ACCEPTANCE, in a general ſenſe, implies the conſent of the perſon who accepts or receives.

The word is formed from the Latin *acceptio*, which is compounded of *ab*, from, and *capio*, to receive.

Acceptance, in common law, is the tacitly agreeing to ſome act which another has already done, and which, without ſuch acceptance, would have been rendered abortive.

Acceptance, in commerce, is the ſigning or ſubſcribing a bill of exchange, by which the acceptor obliges himſelf to pay the contents of the bill.

We ſhould therefore be careful not to accept any bills that we have no effects in hand to anſwer, or that we are not ſure will be remitted within the time; becauſe, when a bill is once accepted, the acceptor becomes the principal debtor, and the bill muſt be abſolutely paid when it becomes due, otherwiſe the acceptor is liable to be ſued for the default of payment. It is uſual to leave bills of exchange with thoſe upon whom they are drawn, for acceptance. But the authors who have wrote upon commerce, obſerve, that ſuch a cuſtom is dangerous, more eſpecially when a bill is indorſed for acquittance, and is not yet accepted, as it may happen ſometimes; in which caſe the bill ſhould not, upon any account whatſoever, be left with the perſon upon whom it is drawn; becauſe, if he was a perſon of bad credit, he might make a bad uſe of it. However, if the perſon with whom a bill of exchange hath been left for acceptance, will keep it in his hands under any pretence whatſoever, the difficulty which he makes of returning it, is tantamount to an acceptance, and he will be obliged to pay the contents.

Bills payable at ſight are not accepted, becauſe they muſt either be paid when preſented, or elſe proteſted for want of payment.

The acceptance of bills payable at a fixed day, at uſance, or double uſance, &c. needs not be dated; becauſe the time is reckoned from the date of the bill: but it is neceſſary to date the acceptance of bills payable at a certain number of days after ſight, becauſe the time does not begin to run till the next day after that acceptance. This kind of acceptance is made thus: *Accepted ſuch a day and year*, and ſigned.

In general, he to whom a bill of exchange is made payable ought to demand the acceptance of the perſon on whom it is drawn, and that in the full extent of the terms of the bill, and on refuſal of acceptance to return it with proteſt: this he ought to do for his own ſecurity, as well as for that of the drawer. Thus, if the bearer of a bill conſents to an acceptance at twenty days ſight, inſtead of eight days expreſſed in the bill, he runs the riſk of the twelve days prolongation; ſo that he can have no recourſe againſt the drawer, ſhould the acceptor break in that time. Again, if a bill be drawn for three thouſand pounds, and the bearer agrees to take an acceptance for two only, and ſhould receive no more than that ſum, the remaining thouſand would be at the hazard of the bearer, as well as in the former caſe.

If therefore a bill be only accepted in part, or for a longer time than that expreſſed in it, the bearer ought to proteſt it, at leaſt for the ſum not accepted.

Again, if the acceptor breaks or refuſes to make payment when the bill becomes due, it is neceſſary to get the bill immediately proteſted by a public notary, to be ſent along with the proteſt to the remitter, to procure ſatisfaction from the drawer.

By ſtatute, inland bills of exchange muſt be accepted by ſigning or endorſing in writing, and proteſted for refuſal of ſuch acceptance, otherwiſe the drawer is not liable to coſts; it muſt likewiſe be returned to the drawer within fourteen days. However, ſuch proteſt is not neceſſary, unleſs the value be acknowledged in the bill to be received, and unleſs the bill be drawn for twenty pounds or upwards.

A bill drawn on two jointly muſt have a joint acceptance, otherwiſe be proteſted; but if on two or either of them, the acceptance of one is ſufficient.

ACCEPTATION, in grammar, is the ſignification or ſenſe wherein a word is taken and received. Moſt words in every language yet known, have ſeveral acceptations.

ACCEPTILLATION, in the civil law, implies an acquittance given by a creditor to a debtor, without receiving any money.

ACCEPTOR, the perſon who accepts a bill of exchange.

ACCESS, in a general ſenſe, implies the approach of one thing towards another: but, in a more particular acceptation, it ſignifies the permiſſion or leave to come near a perſon or thing.

The word is Latin, *acceſſus*, and compounded of *ad*, to, and *cedo*, to ſucceed, or approach.

Access, among phyſicians, is the beginning of a paroxyſm, or fit of an intermitting diſeaſe.

ACCESSIBLE, ſomething that may be approached, or to which acceſs may be had.

Accessible *Altitude* or *Height*. See *Acceſſible* Altitude.

Accessible *Diſtance*. See Distance.

ACCESSION implies, in a general ſenſe, the act of approaching, or going to a place, perſon, or thing. But, in a more reſtrained acceptation, it ſignifies the act whereby a thing is joined or united to ſomething that previouſly exiſted.

Accession is alſo uſed to ſignify a prince's ſucceſſion to the throne; and likewiſe the act of engaging and becoming a party in a treaty before concluded between other powers.

Accession, in the healing art, implies the beginning of the fit or paroxyſm of an intermitting fever.

ACCESSORIUS, a name given to a particular nerve by Dr. Willis. It belongs to the eighth pair, and ariſes by ſeveral filaments from both ſides of the medulla ſpinalis of the neck.

ACCESSORY, or Accessary, in a general ſenſe, implies whatever accedes, or is added to another and more principal object.

Accessory, or Accessary, in law, ſignifies a perſon guilty of a felonious offence, not principally, but by participation, as by command, advice, or concealment.

Acceſſories are of two kinds, viz. acceſſories before the fact, and acceſſories after it. An acceſſory before the fact is he that, being ſent at the time of the felony committed, procures, counſels, commands, or abets another to commit a felony. This is an offence greater than the acceſſory after; and therefore, in many caſes, clergy is taken away from acceſſories before it, which yet is not taken away from acceſſories after, as in petit treaſon, murder, robbery, and wilful burning. Acceſſories after the fact is, where a perſon, knowing the felony to be committed by another, receives, relieves, comforts, or aſſiſts the felon.

ACCIDENT, ſomething produced caſually, without any previous intention in the agent.

Accident, in metaphyſics, ſomething additional or ſuperadded to an object, not eſſentially belonging to it, and without which the object can ſubſiſt.

Accident, in heraldry, is an additional note or mark in a coat of arms, which may be either omitted or retained, without altering the eſſence of the armour.

Accident, among grammarians, implies a property attached to a word, without entering into its eſſential definition; for every word, notwithſtanding its ſignification, will be either primitive, derivative, ſimple, or compound, which are the accidents of words.

A word is ſaid to be primitive, when it is taken from no other word in the language in which it is uſed: thus *heaven*, *king*, *good*, are primitive words. It is ſaid to be derivative, when it is taken from ſome other word: thus *heavenly*, *kingdom*, *goodneſs*, &c. are derivatives. A ſimple word is eaſily diſtinguiſhed from a compound: thus *juſt*, *juſtice*, are ſimple words; *unjuſt*, *injuſtice*, are compound: *res* is a ſimple word as well as *publica*; but *reſpublica* is a compound.

Beſides theſe accidents, which are common to all ſorts of words, each particular ſpecies has its accidents: thus the accidents of the noun ſubſtantive are the gender, declenſion, and number: and the adjective has another accident, namely, the compariſon.

Accident, in logic, is when we join a confuſed and indeterminate idea of ſubſtance with a diſtinct idea of ſome mode; becauſe it is then capable of repreſenting every thing to which that mode can belong. Thus the idea of prudent will comprehend a prudent man, a prudent action, &c. and the idea of round, all round bodies: this forms the fifth univerſal, and is called accident, becauſe not eſſential to the thing to which it is attributed. But it ſhould be obſerved, that when we conſider two ſubſtances together, we may conſider one of them as the mode of the other: thus a dreſſed man may be conſidered as a whole, compoſed of the man and his clothes; but to be dreſſed, in reſpect to that man, is only a mode, under which we conſider him, notwithſtanding the different parts of his habit may be ſubſtances.

Accident, among phyſicians, ſignifies a revolution, occaſioned by ſome new cauſe, which adds ſtrength to the diſeaſe already exiſting. The moſt celebrated practitioners in the healing art recommend the utmoſt attention to the violence of accidents, becauſe their continuance may augment the diſtemper to ſuch a degree as to render it incurable.

ACCIDENTAL, in a general ſenſe, implies ſomething that happens by accident, or that is not eſſential to its ſubject.

Accidental, in philoſophy, is applied to that effect which flows from ſome cauſe intervening by accident, without being ſubject, or at leaſt without any appearance of being ſubject, to general laws, or regular returns. In this ſenſe *accidental* is oppoſed to *conſtant* and *principal*. Thus the ſun's place is, with reſpect to the earth, the conſtant and principal cauſe of the heat in ſummer, and the cold in winter; whereas winds, ſnows, and rains, are the accidental cauſes, which often alter and modify the action of the principal cauſe.

Accidental *Point*, in perſpective, is that point in the horizontal line where the projections of two lines parallel to each other meet the perſpective plane.

ACCIPENSER, in natural hiſtory, a genus of fiſhes, whoſe mouths are tubular and without teeth. They have only a ſingle hole or aperture of the gills on each ſide; the body is oblong, and generally furniſhed with ſeven fins. There are only two ſpecies of this fiſh, namely, the ſturgeon and huſo, or iſinglaſs fiſh. See Sturgeon and Isinglass.

ACCIPITER, in mythology, the name of a genus of birds, whoſe diſtinguiſhing characteriſtic is a crooked or hooked bill. This genus is ſubdivided into three claſſes, the parrot, the owl, and the hawk kinds.

Among the Romans, the term *accipiter* ſignified a hawk, and which, from its being very carnivorous, they conſidered as a bird of bad omen.

> *Odimus accipitrem quia ſemper vivit in armis.* Ovid.

Pliny, however, tells us, that in ſome caſes, particularly in marriage, it was eſteemed a bird of good omen; becauſe it never eats the hearts of other birds; intimating thereby, that no differences, in a married ſtate, ought to reach the heart.

The accipiter was worſhipped as a divinity by the inhabitants of Tentyra, an iſland in the Nile, being conſidered by them as the image of the ſun; and hence we find that luminary repreſented in hieroglyphics, under the figure of a hawk.

ACCISMUS, in antiquity, implies a feigned refuſal of what a perſon earneſtly deſires.

Accismus, in rhetoric, is a ſpecies of irony. See Irony.

ACCLAMATION, a token of joy or applauſe, whereby the public teſtify their eſteem and approbation.

The word is Latin, *acclamatio*, and compounded of *ad*, to, or at, and *clamo*, to ſhout, or cry aloud.

The forms of acclamation, among the ancients, were different among different nations. The Hebrews uſed to cry *Hoſannah*, and the Greeks αγαθη τυχη, good fortune. Herodotus mentions ſome magiſtrates at Athens who were elected by acclamation, though it was not indicated by ſhouts, but by holding up of hands. The Barbarians teſtified their approbation by a confuſed noiſe, or claſhing of their arms. Among the Romans there were three different kinds of acclamations, that of the people, that of the ſenate, and that of the aſſemblies of the learned.

The acclamations of the people were ſhewn at the public entries of emperors and generals; at the ſhews given by the magiſtrates; and at the triumphs of conquerors. Theſe acclamations were originally nothing more than the confuſed ſhouts of the multitude tranſported with joy; the ſimple undiſguiſed expreſſions of public approbation. But, under the emperors, this impetuous motion, to which the people abandoned themſelves as it were by enthuſiaſm, became an art, and a ſtudied harmony; a muſician ſet the tune, and the people giving two chears, alternately repeated the form of the acclamation. The moſt common forms were *feliciter*, *longiorem vitam*, *annos felices*: thoſe of triumph were verſes in praiſe of the conqueror, the ſoldiers and people crying out at certain intervals, *io triumphe*.

The acclamations of the ſenate, though more ſerious, had the ſame end, that of honouring, and often flattering, the prince. The forms generally uſed to teſtify their approbation of his propoſitions, were, *omnes*, *omnes*, *æquum eſt*, *juſtum eſt*.

It was cuſtomary for men of letters to recite their compoſitions in the Capitol, or ſome temple, before a numerous aſſembly ; and the acclamations were there given nearly in the ſame manner as at the public ſhews.

ACCLIVIS, in anatomy, is the name by which ſome writers call the obliquus aſcendens.

ACCLIVITY, the ſlope or aſcent of a line or plane, conſidered in its aſcending direction.

The word is Latin, and compounded of *ad*, and *clivus*, a ſlope.

Some writers on fortification have uſed the term aclivity as ſynonimous with talus ; but the latter properly ſignifies the ſlope in general, whether it be conſidered as aſcending or deſcending.

ACCLOYED, in farriery, ſignifies pricked. Thus a horſe's foot, when pricked with a nail in ſhoeing, is ſaid to be accloyed.

ACCOMMODATION, among divines, implies the application of what is ſaid of one perſon or thing to another. Thus the words of Iſaiah, delivered to the Jews of his time, are, by St. Paul, accommodated to that people who were contemporaries with the apoſtle.

The word is Latin, and compounded of *ad*, to, and *commodius*, commodious.

Accommodation, in philoſophy, is the application of one thing to another by analogy.

Accommodation, in law, ſignifies an amicable agreement between two contending parties.

ACCOMPANYMENT, in muſic, implies the inſtruments that accompany a voice to render the melody more agreeable.

The manner of accompanying depends more upon practice and taſte, than upon any rules that can be given.

Accompanyments, in painting, are the objects added either by way of ornament or probability. Thus dogs, guns, and game, are the proper accompanyments of a hunting piece, and tend greatly to ornament the picture.

ACCOMPLICE, in law, is a perſon who was privy to, or aſſiſted in, the perpetration of ſome crime. See Acceſſory.

The word is compounded of the Latin *ad*, to, *con*, together, and *plico*, to fold.

ACCOMPLISHMENT, in a general ſenſe, ſignifies the execution and ſucceſs of a thing we before propoſed to ourſelves.

The word is compounded of the Latin *ad*, and *compleo*, to finiſh, or fulfil.

The accompliſhment of the prophecies of the Old Teſtament, in the perſon of Our Saviour, very clearly ſhews that he was the Meſſiah.

The accompliſhment of a prophecy may be done two ways, either directly, or by accommodation ; for one and the ſame prophecy may have ſeveral accompliſhments at different times : as, for inſtance, that of Our Saviour, touching the deſtruction of Jeruſalem, which muſt have a ſecond accompliſhment in the times which ſhall immediately precede the laſt judgment

This principle is not, however, univerſal, and may even be dangerous in many reſpects, by falling into the ſyſtem of Grotius upon the accompliſhment of prophecies. We muſt therefore ſay, that the accompliſhment, or the literal ſenſe of the prophecy, is its direct accompliſhment, and that the figurative ſenſe of a prophecy is its accompliſhment by accommodation : this implies no more than that the prophecies have been literally accompliſhed in the perſon of Jeſus Chriſt, whom they prove to be the Meſſiah. As to the accompliſhment of accommodation, it is proved no further than it is contained, or clearly pointed out, in the Scriptures, or conſtantly delivered down to us by tradition ; for we are not ignorant how far fanaticiſm, and the irregularity of imagination, may go in this matter, when we would interpret the ſenſe of prophecies, and fix the accompliſhment of them according to our own fancies. Thoſe who are perſuaded that the human mind is not of itſelf more capable of fixing the accompliſhment of a prophecy, than of predicting the future in a ſure and circumſtantial manner, ſhould always obſerve this rule, *omnis prophetia ſcripturæ propria interpretatione non fit*.

We ſhall, however, add, that there are prophecies partly accompliſhed in one ſenſe, and in reſpect of a certain object ; and fully accompliſhed in another : ſuch are the predictions of the deſtruction of Jeruſalem, and ſome of thoſe in the Apocalypſe.

ACCOMPT. See Account.

ACCORD, in muſic, the ſame with concord. See Concord.

Accord, in law, implies an accommodation between contending parties, by means of an offer made by the one, and accepted by the other.

Accord, in painting, ſignifies the harmony that reigns among the lights and ſhades of a picture.

ACCORNED, in heraldry, is the term applied to every animal borne in an eſcutcheon, when its horns are of different colours from thoſe of the real animal ; when it is ſaid to be accorned.

ACCOUNT, or Accompt, in arithmetic, a computation of the number of certain things, whether they relate to time, weight, meaſure, money, &c.

The word is compounded of the Latin *ad*, to, and *computus*, computation.

Account, is alſo uſed to ſignify the books in which merchants, &c. enter all their buſineſs. See Book-keeping.

Account *in company* is an account kept by traders in partnerſhip, containing all the articles relating to their joint trade.

Account, in law, ſignifies a writ or action which lies againſt a bailiff, or receiver, who refuſes to give a proper account to another appointed for that purpoſe.

The proceedings upon this action being difficult, dilatory, and expenſive, it is now ſeldom uſed, eſpecially if the party has any other remedy, as debt, covenant, caſe, or other action ; or if the demand be of conſequence, and the matter of an intricate nature ; for, in ſuch caſes, it is more adviſeable to have recourſe to a court of equity, where matters of account are more commodiouſly adjuſted, and more advantageouſly determined with regard to both parties ; the plaintiff being in that court entitled to a diſcovery of books, papers, and the defendant's oath : and, on the other hand, the defendant allowed to diſcount the ſums paid or expended by him, and all reaſonable allowances, and to diſcharge himſelf of ſums under forty ſhillings by his own oath, if by anſwer or other writing he charges himſelf with ſuch. He is likewiſe entitled, after the account is ſettled, to a decree in his favour, if any thing appears to be due to him on the balance.

Chamber of Accounts, the name of a ſovereign court in France, anſwering nearly to our Exchequer.

ACCOUNTANT, or Accomptant, a perſon appointed to keep the accounts of a company, office, &c. It alſo ſignifies one ſkilled in the nature of accounts, or who makes the ſtudy and practice of accounts his buſineſs.

Accountant-general is an officer in the Court of Chancery, appointed by act of parliament to receive all monies lodged in court, and convey the ſame to the bank of England for the better ſecurity.

ACCRETION, in natural hiſtory and philoſophy, is the increaſe or augmentation of a body by the addition of new parts. See Nutrition.

The word is Latin, *accretio*, and compounded of *ad*, to, and *creſco*, to grow.

Accretion, in the civil law, implies the property of a vague or unoccupied thing, acquired by its adhering to or following another thing already occupied.

ACCUSATION, in law, ſignifies the act of accuſing, or the charge brought againſt any one for a crime.

The word is Latin, *accuſatio*, and compounded of *ad*, to, and *cauſor*, to blame.

By Magna Charta, no man ſhall be impriſoned or condemned on any accuſation, without trial by his peers, or the law. None ſhall be vexed with any accuſation, but according to the law of the land : and no man may be moleſted by petition to the king, &c. unleſs it be by indictment or preſentment of lawful men, or by proceſs at common law. Promoters of ſuggeſtions are to find ſurety to purſue them, and if they do not make them good, ſhall pay damages to the party accuſed, and alſo a fine to the king. No perſon is obliged to anſwer upon oath to a queſtion whereby he may accuſe himſelf of any crime, &c.

ACCUSATIVE, in the Latin grammar, is the fourth caſe of nouns, and ſignifies the relation of the noun on which the action implied in the verb terminates; and hence, in ſuch languages as have caſes, theſe nouns have a particular termination called accuſative: as *Auguſtus vicit Antonium*, Auguſtus vanquiſhed Antony. Here *Antonium* is the noun, on which the action implied in the verb *vicit* terminates; and therefore muſt have the accuſative termination. Ovid, ſpeaking of the palace of the ſun, ſays, *Materiem ſuperabat opus.* The work ſurpaſſed the materials. Here *materiem* has the accuſative termination; becauſe it determines the action of the verb *ſuperabat*.

In the Engliſh language there are no caſes, except the genitive, the relation of the noun being ſhewn by the aſſiſtance of prepoſitions, as *of*, *to*, *from*, *&c.* By this means we are not embarraſſed with the trouble and difficulties attending other languages.

ACEPHALI, or ACEPHALITÆ, in eccleſiaſtical hiſtory, a term applied to ſeveral ſects who refuſed to follow ſome noted leader. Thus the perſons who refuſed to follow either John of Antioch, or St. Cyril, in a diſpute that happened in the council of Epheſus, were termed *Acephali*, without a head, or leader. Such biſhops alſo as were exempt from the diſcipline and juriſdiction of their patriarch were ſtiled *Acephali*.

The word is Greek, and compounded of α priv. and κεφαλη, a head.

ACER, in botany, the maple-tree. See MAPLE.

ACER *Majus*, the great maple, commonly called the ſycamore. See *Great* MAPLE.

ACERIA, in antiquity, an altar, erected by the Romans, near the gate of a perſon deceaſed, on which his friends daily offered incenſe till the time of his burial.

The Chineſe have ſtill a cuſtom ſimilar to this, of erecting an altar to a perſon immediately after his deceaſe, in ſome room of the houſe which is generally hung with mourning. An image, or repreſentation of the deceaſed, is laid upon the altar, and every one approaches it, bows four times, and offers oblations of perfumes.

ACETABULUM, in antiquity, a meaſure uſed by the ancients, equal to one eighth of our pint.

It ſeems to have acquired its name from a veſſel in which *acetum*, or vinegar, was brought to their tables, and probably contained about this quantity.

ACETABULUM, in anatomy, a large cavity of a bone which receives another convex bone in order to admit of a circular motion in the joint thus articulated.

Thus the large cavity found in the oſſa innominata is particularly called the acetabulum, which receives the head of the femur, or thigh bone. It is formed by the juncture of the os ilium, iſchium, and pubes.

ACETABULUM alſo ſignifies a kind of glandular ſubſtance, many of which are found in the placenta of ſome animals. See COTYLEDON.

ACETABULUM, in botany, a genus of ſea plants, whoſe leaves are ſhaped like a baſon.

ACETARY, a term uſed by Dr. Grew, for a certain part of the ſtructure of ſome fruits, on account of its ſourneſs.

ACETOSA, in botany, common ſorrel. It has a long, fibrous, yellowiſh, bitter root, and long oval leaves placed alternately on the ſtalk, which is ſtriated a foot in length, and divided into ſeveral branches. The impalement of the flower is compoſed of three ſmall leaves bended backwards. The flower has three leaves, larger than thoſe of the impalement. In the center of the flower is a three cornered pointal, or piſtil, ſupporting three ſmall ſtyles, ſurrounded with ſix ſtamina. It afterwards becomes a triangular ſeed, incloſed by the petals of the flower. In ſhort, it agrees with the dock in all its characters, except in having an acid taſte. It is but a ſmall plant in the fields, but in the gardens produces large leaves. It muſt be ſown early in the ſpring, in a ſhady moiſt border; and, if the plants are afterwards removed into another ſhady border, they will produce ſtill larger leaves, and continue much longer. Sorrel is uſed in medicine to cool and quench thirſt; and the decoction of the leaves makes a uſeful drink in fevers. It is excellent againſt the ſcurvy, and in ſome cold countries they uſe a mixture of the juices of ſorrel and ſcurvy-graſs againſt this diſeaſe with ſucceſs. *Brookes's Natural Hiſt.*

ACETOSA *Rotundifolia*, round-leaved or French ſorrel. This plant has the ſame character as the former, excepting the leaves, which are ſometimes almoſt round. This is the beſt ſort for kitchen uſe, and therefore is often planted in gardens. The roots are very apt to ſpread, by which means it is eaſily propagated, and muſt be planted at greater diſtances than the former, namely, a foot at leaſt. It is cooling like the former, quenches thriſt, and excites an appetite. The decoction of it is good in bilious fevers. *Brookes's Natural Hiſt.*

ACETOSE, or ACETOUS, an epithet applied to ſuch liquors, fruits, &c. as have a ſour taſte, or partake of the nature of vinegar.

ACETUM, vinegar. See the article VINEGAR.

ACETUM *diſtillatum*, diſtilled vinegar. See *diſtilled* VINEGAR.

Spiritus ACETI, ſpirit of vinegar. See *Spirit* of VINEGAR.

ACETUM *Roſatum*, vinegar of roſes. See *Vinegar* of ROSES.

ACETUM *Radicatum*, a name given by the old chemiſts to what is now called Tartarus regeneratus. See TARTARUS *Regeneratus*.

ACHANE, a corn meaſure anciently uſed in Perſia: it was equal to forty-five Attic medini.

ACHAT, in law, implies a purchaſe or bargain. And hence probably purveyors were called *Achaters*, from their making bargains.

ACHATES, in natural hiſtory, a precious ſtone generally called an agate. See AGATE.

ACHE, or ACH, a ſevere pain in any part of the body, as the head-ache, tooth-ache, &c. See HEAD-ACHE, TOOTH-ACHE, &c.

ACHERNER, in aſtronomy, a ſtar of the firſt magnitude in the ſouthern extremity of the conſtellation Eridanus. Its longitude is 11°. 48′ 20″. of Piſces, and its latitude 32°. 46′. 3″. S.

ACHILLEA, in the Linnean ſyſtem of botany, a genus of plants of the ſyngeneſia claſs, comprehending the millefolium and ptarmica of Tournefort.

ACHILLEAD, or ACHILLEIS, the title of a famous poem, written by Statius, in which that poet intended to relate the whole life of Achilles; but was prevented by death from executing his purpoſe. The work contains only the infancy and education of the hero; and even that hiſtory is very imperfect.

This work is of the epic kind, but very deficient in the plan or fable, though Julius Scaliger has preferred Statius to all the heroic poets of Greece and Rome, Homer not excepted. It is however generally agreed that Statius has treated his ſubject more like an hiſtorian than a poet, without confining himſelf to what conſtitutes a true epic poem. At the ſame time his diction and verſification, by ineffectually endeavouring to reach the ſublime, becomes tumid, and deviates into bombaſt. Nor is the entire hiſtory of the life of an hero a proper ſubject of an epic poem.

ACHILLES, an appellation ſometimes given to the principal argument made uſe of by each ſect of ancient philoſophers in defence of their ſyſtem.

Tendo ACHILLES, in anatomy, is the tendon formed by the tails of ſeveral muſcles, and inſerted into the os calcis. It has its name from the fatal wound Achilles is ſaid to have received in that part before the walls of Troy.

ACHOR, in phyſic, is a ſpecies of the herpes, and appears with a cruſted ſcab formed by a humour ſomewhat viſcid, and reſembling ichor, whence the ſore itſelf is called achor. It is occaſioned by a ſalt ſharp ſerum oozing through the ſkin.

ACHRONICAL, in aſtronomy, ſee the article ACRONICAL.

ACID, a general name for every thing that affects the organs of taſte with a pungent ſourneſs.

Acids are the moſt ſimple of all ſaline ſubſtances with regard to their taſte; and by that particular they are chiefly known. They have alſo the property of turning all the blue and violet colours of vegetables red, which diſtinguiſhes them from all other ſalts.

The form under which acids moſt commonly appear, is that of a tranſparent liquor; though ſolidity is rather their natural ſtate. This is owing to their affinity with water; which is ſo great, that, when they contain but juſt as much of it as is neceſſary to conſtitute them ſalts, and conſequently have a ſolid form, they rapidly unite with that fluid the moment they come into contact with it: and, as the air is always loaded with moiſture and aqueous vapours, its contact alone is ſufficient to liquify acid ſalts; becauſe they unite with its humidity, imbibe it greedily, and by that means become fluid. We therefore ſay, they attract the moiſture of the air. This change of a ſalt from a ſolid to a fluid ſtate, by the ſole contact of the air, is alſo called deliquium; ſo that when a ſalt changes in this manner from a ſolid into a fluid form, it is ſaid to run *per deliquium*.

Acids in general have a great affinity with earths: that with which they moſt readily unite, is that called abſorbent earth. They ſeem to exert no action at all upon vitrifiable earths, ſuch as ſand, and ſome other kinds, at leaſt while they continue in their natural ſtate.

When an acid liquor is mixed with an abſorbent earth, for inſtance with chalk, theſe two ſubſtances inſtantly unite with ſo much impetuoſity, eſpecially if the acid liquor be thoroughly dephlegmated, that a great ebullition is immediately produced, attended with conſiderable hiſſing, heat, and vapours, which riſe the very inſtant of their conjunction.

From the combination of an acid with an abſorbent earth, there ariſes a new compound, which ſome chemiſts have called *ſal ſalſum*; becauſe the acid, by uniting with the earth, loſes its ſour taſte, and acquires another not unlike that of the common ſea-ſalt uſed in our kitchens; yet varying according to the different ſorts of acids and earths combined together. The acid at the ſame time loſes its property of turning vegetable blues and violet colours, red.

If we enquire what is become of its propenſity to unite with water, we ſhall find that the earth, which of itſelf is not ſoluble in water, hath, by its union with the acid, acquired a facility of diſſolving therein; ſo that our *ſal ſalſum* is ſoluble in water. But, on the other hand, the acid hath, by its union with the earth, loſt part of the affinity it had with water; ſo that if a *ſal ſalſum* be dried, and freed of all ſuperfluous humidity, it will remain in that dry ſolid form, inſtead of attracting the moiſture of the air, and running *per deliquium*, as the acid would do, if it were pure and unmixed with earth. This general rule, however, admits of ſome exceptions; and we ſhall have occaſion in another place to take notice of certain combinations of acids with earths, which ſtill continue to attract the moiſture of the air, though not ſo ſtrongly as a pure acid.

Univerſal or *Vitriolic* ACID is ſo called, becauſe it is in fact the acid which is moſt univerſally diffuſed through all nature, in waters, in the atmoſphere, and in the bowels of the earth. But it is ſeldom pure, being almoſt always combined with ſome other ſubſtance. That from which we obtain it with moſt eaſe, and in the greateſt quantity, is vitriol, a mineral which we ſhall conſider afterwards: and this is the reaſon why it is called the vitriolic acid, the name by which it is generally known. See VITRIOL.

When the vitriolic acid contains but little phlegm, yet enough to give it a fluid form, it is called oil of vitriol. See *Oil of* VITRIOL.

If the vitriolic acid contain much water, it is then called *Spirit of* VITRIOL. When it does not contain enough to render it fluid, and ſo is in a ſolid form, it is named the *Icy Oil of* VITRIOL. See each under its proper article.

When oil of vitriol highly concentrated is mixed with water, they ruſh into union with ſuch impetuoſity, that the moment they touch each other, there ariſes a hiſſing noiſe like that of red-hot iron plunged in cold water, together with a very conſiderable degree of heat proportioned to the degree in which the acid was concentrated.

If, inſtead of mixing this concentrated acid with water, you only leave it expoſed to the air for ſome time, it attracts and imbibes the moiſture. Both its bulk and its weight are increaſed by this acceſſion; and if it be under an icy form, that is, if it be concreted, the phlegm thus acquired will ſoon reſolve it into a fluid.

The addition of water renders the vitriolic acid, and indeed all other acids, weaker in one ſenſe; that is, they leave on the tongue a much fainter taſte of acidity, and are leſs active in the ſolution of ſome particular bodies; but occaſions no change in the ſtrength of their affinities; it even, in ſome caſes, enables them to diſſolve ſeveral ſubſtances, which, when well dephlegmated, they are incapable of attacking.

The vitriolic acid, combined to the point of ſaturation with a particular abſorbent earth, the nature of which is not yet well known, forms a neutral ſalt that chryſtallizes. This ſalt is called *Alum*, and the figure of its chryſtals is that of an octahedron or ſolid of eight ſides. See ALUM.

The vitriolic acid, combined with certain earths, forms a kind of neutral ſalt called *Selenites*, which chryſtallizes in different forms, according to the nature of its earth. There are numberleſs ſprings of water impregnated with diſſolved *Selenites*; but when once this ſalt is chryſtallized, it is exceeding difficult to diſſolve it in water a ſecond time. See the article SELENITES.

If an alkali be preſented to the ſelenites, or to alum, theſe ſalts will be thereby decompoſed; that is, the acid will quit the earths, and join the alkali, with which it hath a greater affinity. And, from this conjunction of the vitriolic acid with a fixed alkali, there reſults another ſort of neutral ſalt, which is called *Arcanum duplicatum*, *Sal de duobus*, and *vitriolated Tartar*, becauſe one of the fixed alkalies moſt in uſe is called *Salt of Tartar*. See *Salt of* TARTAR.

The vitriolic acid is capable of uniting with the phlogiſton, or rather it has a greater affinity with it than with any other body: whence it follows that all compounds, of which it makes a part, may be decompoſed by means of the phlogiſton.

From the conjunction of the vitriolic acid with the phlogiſton, ariſes a compound called *Mineral Sulphur*; becauſe it is found perfectly formed in the bowels of the earth. It is alſo called ſulphur vivum, or ſimply, ſulphur. See SULPHUR.

Nitrous ACID, a particular kind of acid, which, combined with an alkaline ſalt, forms a body called Nitre. See NITRE.

It is not certainly known what conſtitutes the difference between the nitrous and the vitriolic acid, with regard to the conſtituent principles of each. The moſt probable opinion is, that the nitrous acid is no other than the vitriolic acid combined with a certain quantity of phlogiſton by the means of putrefaction. If this be fact, the phlogiſton muſt be united with the univerſal acid in another manner than it is in ſulphur, and in its volatile ſpirit; for the nitrous acid differs from them both in its properties. What increaſes the probability of this opinion, is, that the nitrous acid is found only in earths and ſtones which have been impregnated with matters ſubject to putrefaction, and which therefore muſt contain the phlogiſton; for it ſhould be obſerved, that all ſubſtances ſuſceptible of putrefaction, really contain the phlogiſton.

The nitrous acid, combined with certain abſorbent earths, ſuch as chalk, marble, boles, forms neutral ſalts which do not chryſtallize; and which, after being dried, run in the air *per deliquium*.

All thoſe neutral ſalts, which conſiſt of the nitrous acid, joined to an earth, may be decompoſed by a fixed alkali, with which the acid unites, and deſerts the earth; and from this union of the nitrous acid with a fixed alkali, reſults a new neutral ſalt, which is called *Nitre*, or *Salt-petre*. See NITRE.

The nitrous acid hath not ſo great an affinity with earths and alkalis, as the vitriolic acid hath with the ſame ſubſtances; whence it follows, that the vitriolic acid decompoſes all neutral ſalts ariſing from a combination of the nitrous acid with an earth or an alkali. The vitriolic acid expels the nitrous acid, unites with the ſubſtance which ſerved it for a baſis, and forms therewith a neutral ſalt, which is either an alum, a ſelenites, or a vitriolated tartar, according to the nature of that baſis.

The nitrous acid, when thus ſeparated from its baſis by the vitriolic acid, is named *Spirit of Nitre*, or *Aqua Fortis*. If it be dephlegmated, or contain but little ſuperfluous water, it exhales in reddiſh vapours; theſe vapours, being condenſed and collected, form a liquor of a browniſh yellow, that inceſſantly emits vapours of the ſame colour, and of a pungent diſagreeable ſmell. Theſe characters have procured it the names of ſmoking ſpirit of nitre, and yellow aqua fortis. This property in the nitrous acid, of exhaling in vapours, ſhews it to be leſs fixed than the vitriolic acid; for the latter, though ever ſo thoroughly dephlegmated, never yields any vapours, nor has it any ſmell. See *Spirit of* NITRE, and AQUA *Fortis*.

Marine ACID, or the ACID *of Sea Salt*, an acid obtained from ſuch ſea ſalt as is uſed in our kitchens.

It is not certainly known in what this acid differs from the vitriolic and the nitrous, with regard to its conſtituent parts. Several of the ableſt chymiſts, ſuch as Becher and Stahl, are of opinion that the marine acid is no other than the univerſal acid, united to a particular principle which they call a mercurial earth; but it muſt be owned, that the truth of this opinion is ſo far from being proved by a ſufficient number of experiments, that the very exiſtence of ſuch a mercurial earth is not yet well eſtabliſhed; and therefore, that we may not exceed the bounds of our knowledge, we ſhall content ourſelves with delivering here the properties which characterize the acid in queſtion, and by which it is diſtinguiſhed from the two others already conſidered.

When it is combined with abſorbent earths, ſuch as lime and chalk, it forms a neutral ſalt that does not chryſtallize, and, when dried, attracts the moiſture of the air. If the abſorbent earth be not fully ſaturated with the marine acid, the ſalt thereby formed has the properties of a fixed alkali. The marine acid, like the reſt, hath not ſo great an affinity with earths, as with fixed alkalies.

When it is combined with the latter, it forms a neutral ſalt, which ſhoots into cubical chryſtals. This ſalt is inclined to grow moiſt in the air, and is conſequently one of thoſe which water diſſolves in equal quantities, at leaſt as to ſenſe, whether it be boiling hot or quite cold.

The affinity of this acid with alkalies and abſorbent earths is not ſo great as that of the vitriolic and nitrous acids with the ſame ſubſtances: whence it follows, that, when combined therewith, it may be ſeparated from them by either of thoſe acids.

The acid of ſea ſalt, thus diſengaged from the ſubſtance which ſerved it for a baſis, is called *Spirit of Salt*. See *Spirit of* SEA-SALT.

The acid of ſea-ſalt, like the other two, ſeems to have a greater affinity with the phlogiſton than with fixed alkalis. We are led to this opinion by a very curious operation, which gives reaſon to think that ſea-ſalt may be decompoſed by the proper application of a ſubſtance containing the phlogiſton.

From the marine acid, combined with a phlogiſton, reſults a kind of ſulphur, differing from the common ſort in many reſpects; but particularly in this property, that it takes fire of itſelf upon being expoſed to the open air. This combination is called *Phoſphorus*. See the article PHOSPHORUS.

From what has been ſaid of the union of the acid of ſea-ſalt with a fixed alkali, and of the neutral ſalt reſulting from that combination, it may be concluded that this neutral ſalt is no other than the common kitchen ſalt. But it muſt be obſerved that the fixed alkali, which is the natural baſis of the common ſalt obtained from ſea-water, is of a ſort ſomewhat different from fixed alkalis in general, and hath certain properties peculiar to itſelf. See the article NATRON.

If the acid of ſea-ſalt be ſeparated from its baſis, by means of the vitriolic acid, it is eaſy to ſee that, when the operation is finiſhed, the ſalt we have been ſpeaking of muſt be the reſult. Glauber, a famous chymiſt, was the firſt who extracted the ſpirit of ſalt in this manner, examined the neutral ſalt reſulting from his proceſs, and, finding it to have ſome ſingular properties, called it his *Sal mirabile*, or wonderful ſalt: on this account it is ſtill called Glauber's *Sal mirabile*, or plainly Glauber's ſalt. See SAL *mirabile Glauberi*.

When the baſis of ſea-ſalt is combined with the nitrous acid to the point of ſaturation, there reſults a neutral ſalt, or a ſort of nitre, differing from the common nitre; firſt, in that it attracts the moiſture of the air pretty ſtrongly, and this makes it difficult to chryſtallize; ſecondly, in the figure of its chryſtals, which are parallelopipeds; and this has procured it the name of quadrangular nitre.

Common ſalt, or the neutral ſalt, formed by the combining the marine acid with this particular ſort of fixed alkali, has a taſte well known to every body. The figure of its chryſtals is exactly cubical. It grows moiſt in the air, and, when expoſed to the fire, it burſts before it melts into many little fragments, with a crackling noiſe; which is called the decrepitation of ſea ſalt.

That neutral ſalt mentioned above, which is formed by combining the marine acid with a common fixed alkali, and called ſal febrifugum ſylvii, hath alſo this property.

Vegetable ACID. See the articles TARTAR and VINEGAR.

Animal ACID. See ANALYSIS of *Animal Subſtances*.

ACIDS, in the materia medica, are ſuch medicines as are poſſeſſed of an acid quality; as vinegar, tartar, the juice of lemons, and other vegetable productions, ſpirit of vitriol, &c.

“All fermenting juices, ſays Dr. Cheyne, as acids plainly are, muſt be highly injurious to weak conſtitutions; for, by meeting with crudities in the bowels, they muſt raiſe a new conflict and colluctation there, and ſo muſt blow up the cavities of the human body with acrid fumes and vapours, the great and ſore enemies to ſuch bowels.” But we cannot help thinking that this cenſure is too general; and that the vinous acids ſhould have been excepted. It is indeed well known that, in the Weſt Indies, where the violence of the heat renders it neceſſary to drink large quantities, and the want of proper liquors obliges them to drink much punch, the acid of the lemons and oranges, though in their full perfection, cauſes that nervous and mortal diſtemper, called the *dry belly-ache*, as well as palſies, cramps, and convulſions. But we apprehend, that if cream of tartar was ſubſtituted inſtead of the acid of lemons and oranges, theſe terrible diſeaſes would be avoided, at leaſt as far as the acid can be ſuppoſed to cauſe them: and it ſhould be remembered that the ancient Romans were ſo fully perſuaded of the virtues of vinous acids, that the drink of their common ſoldiers was water mixed with vinegar, a compoſition which they called *Poſca*. Hippocrates ſays, that vinegar is refreſhing (οξος ψυκτικον) for which reaſon it was given to reapers and thoſe who worked in the field.

ACIDITY, that quality in bodies which renders them acid. See ACID.

ACIDULÆ, a name given to thoſe mineral waters which are ſuppoſed to be impregnated with ſome acid; an opinion which later obſervations have proved to be deſtitute of foundation. It is however ſtill uſed as an appellation of cold mineral waters, to diſtinguiſh them from thoſe that are hot. See *Medicinal* WATERS.

The word is a diminutive of *acidus*, which is formed from the Greek ακη, a point or edge.

ACINI, in botany, an appellation applied to grapes or berries growing in cluſters, to diſtinguiſh them from *baccæ*, or ſuch as grow ſingle.

ACINIFORMIS *Tunica*, in anatomy, the ſame with Uvea. See UVEA.

The word is compounded of the Latin *acinus*, a grape, and *forma*, ſhape.

ACKNOWLEDGMENT-MONEY, in law, implies a ſum of money paid to the tenant on the death of his landlord, as an acknowledgment of a new landlord.

ACLEA, in antiquity, ſignifies a place or field where oaks grow.

The word is compounded of the Saxon *ac*, an oak, and *leag*, a place.

ACLONIA, in botany, the name of a plant common in Guinea, where the inhabitants uſe it to cure the itch. Its leaves reſemble thoſe of the gum-tragacanth ſhrub, and is thought to be a ſpecies of the colutea.

ACKME, in a general ſenſe, implies the height, ſummit, or point of any thing.

The word is Greek, ακμη, implying the point or top, and ſeems to be a radix or root in that language.

ACKME, among phyſicians, ſignifies that ſtate of a diſeaſe when it is increaſed to its utmoſt violence.

ACNUA, in the agriculture of the ancient Romans, ſignified the length of one furrow, or the diſtance a plow goes before it is turned.

ACNUA alſo ſignified a certain determinate meaſure, containing one hundred and twenty feet in length; and therefore may be properly called, in Engliſh, a furlong.

There were three ſorts of this meaſure among the ancients, the leaſt of which contained 120 feet in length, and 40 in breadth, being equal to a fourth part of the Roman jugerum or acre. The ſecond, which they generally called *actus quadratus*, contained 120 feet in length, and the ſame in breadth, being half the jugerum. The third contained 240 in length, and 20 in breadth, making the jugerum.

ACOEMETÆ, or ACOEMETI, in eccleſiaſtical hiſtory, an ancient order of monks among the eaſtern chriſtians, who continued a perpetual courſe of divine ſervice; ſo that their churches were never ſilent.

The word is Greek, ακοιμηται, compounded of the α priv. and κοιμαω, to ſleep.

They obtained this appellation, which properly ſignifies watchers, not from their never ſleeping, but from their performing divine ſervice continually night and day, without intermiſſion; for, by dividing themſelves into three claſſes, each company officiated in their turn, and relieved the other.

The firſt monaſtery of the Acoemetæ was built by St. Alexander, on the banks of the Euphrates, about the year 430: but, during his life, a great number were erected by his diſciples. Alexander alſo eſtabliſhed another convent of Acoemetæ at Conſtantinople, which, after his death, was removed into Bithynia by John his ſucceſſor. John was ſucceeded by Marcellus, whom Nicephorus believed to be the inſtitutor, probably becauſe during his life this order of monks acquired, by their exemplary piety, the higheſt eſteem and veneration, and the number of their convents was prodigiouſly increaſed. Among others, one Studius, a nobleman of conſular dignity at Rome, became one of this order, renounced the world, and erected a famous monaſtery, which he dedicated to St. John the Baptiſt, calling it after his own name *Studium*, and the monks *Studitæ*. About a thouſand religious were ſettled in this houſe, which was a conſiderable time famous for a great many perſons eminent both in devotion and learning. But afterwards the Acoemetæ ſunk in their credit, by favouring the hereſy of the Neſtorians, and were at laſt condemned by the emperor Juſtinian, and pope John II. in the year 532.

ACOEMETÆ was alſo the name given to the Stilites, and other monks of Paleſtine.

There are ſtill a kind of Acoemetæ ſubſiſting in the Roman church, generally called the religious of the holy ſacrament, who keep up a perpetual adoration, ſome or other of them praying before the hoſt day and night.

ACOLIN, in natural hiſtory, is the name of a bird common in the Spaniſh Weſt Indies. It is of the partridge kind; but not larger than the common ſtarling.

ACOLUTHI, or ACOLUTHISTS, in antiquity, was an appellation given to thoſe perſons who were ſteady and immoveable in their reſolutions: and hence the ſtoics, becauſe they would not forſake their principles, nor alter their reſolutions, acquired the title of Acoluthi.

The word is Greek, and compounded of α, priv. and κελευθος, way; as never turning from the original courſe.

ACOLUTHI, among the ancient chriſtians, implied a peculiar order of the inferior clergy in the Latin church; for they were unknown to the Greeks for above four hundred years. They were next to the ſub-deacon; and we learn, from the fourth council of Carthage, that the archdeacon, at their ordination, put into their hands a candleſtick with a taper, giving them thereby to underſtand, that they were appointed to light the candles of the church; as alſo an empty pitcher, to imply that they were to furniſh wine for the euchariſt. Some think they had another office, that of attending the biſhop wherever he went.

The word is Greek, and compounded of α, priv. and κωλυω, to hinder or diſturb.

The office of acoluthiſts, whatever the papiſts may advance to prove its apoſtolical inſtitution, is no longer in being in the church of Rome, but is changed into that of *Ceroferarii*, or taper-bearers, whoſe office it is to walk before the deacons, &c. with lighted tapers in their hands; an office very different from the acoluthiſts of the ancient church: and we may obſerve, in general, that the under-orders of the Roman bear no reſemblance to thoſe of the primitive church.

ACONEROBA, in botany, the name of a plant growing in Guinea, where it is greatly eſteemed for its virtues in the ſmall-pox. Its leaves reſemble thoſe of our bay, and grow in pairs.

ACONITE, the name of a genus of plants, known among us by the names of wolfeſbane and monkſhood.

The flower of the aconite is of the polypetalous, anomalous kind, being compoſed of five irregular leaves, reſembling in ſome meaſure a man's head, with a helmet or hood on it. The upper petal repreſents the hood or helmet; the two lower ones ſtand for that part which covers the lower jaw; and the two wings ſeem adapted for covering the temples. From the center of the flower there ariſe two piſtils, reſembling feet, and received into the hollow of the upper petal, or hood; as is alſo another piſtil, which finally becomes a fruit, compoſed of ſeveral membranaceous vaginæ, collected into a head, and uſually containing angular and wrinkled ſeeds.

All the ſpecies of aconite are extremely acrimonious, and the only one ever uſed in medicine is called anthora. See the article ANTHORA.

ACONTIAS, in zoology, is a ſpecies of ſerpent, otherwiſe called jaculum, or the dart, from its vibrating its body in the manner of a dart.

The word is Greek, and derived from ακων, a dart.

Belon, or Bellon, met with it in the Iſle of Rhodes, and acquaints us that it is three palms in length, and about the thickneſs of a man's little finger; of a whitiſh aſh colour, except the belly, which is entirely white, and a few little ſpots like eyes upon the back. The neck is black, and from thence there run two white lines along the back to the tail. The ſpots, which are black, are no bigger than a lentil, and encompaſſed with a white circle. Authors affirm that they get upon trees, from whence they dart themſelves upon people as they paſs along, and that their bite is mortal. They are common in Egypt, Lybia, and the Iſlands of the Mediterranean ſea. Late authors mention different kinds of theſe ſerpents; and the following deſcriptions have been ſent to Europe from different parts of the world.

Seba ſpeaks of three kinds of darts, the firſt of which has a pointed tail, armed with two hard ſtrings like the forked tongues of ſome ſerpents. They lurk in hollow trees, where they wait for their prey, and dart upon it with great ſwiftneſs. This kind has a long head, large eyes, and jaws well furniſhed with ſharp teeth. The ſcales that cover the foreheaad and upper part of the body are uniform, regularly placed, and of a reddiſh blue colour, except a furrow in the middle, which is white; but the ſcales under the belly are of a pale yellow, mottled with red ſpots. This ſerpent was ſeen at Santa-cruz in America.

The dart of Amboyna is called by the Dutch ſpaitſlang, or the ſyringe ſerpent, becauſe it raiſes itſelf as ſwiftly as water ejected from a ſyringe. It is as thick as a man's arm, ſix feet in length, and covered with ſcales diſpoſed in the form of lozenges, tinged with a reddiſh brown, thoſe on the back and ſides of a ſea-green, and thoſe on the belly of a bright aſh colour. The ſkin is ſmooth, and the head of the middle ſize; the eyes are very large and ſhining; the teeth ſmall, and the tail long and pointed.

The acontia, found in New Spain, is covered with yellow and reddiſh ſcales, placed in the form of lozenges, divided along the middle by ſtreaks running from the head to the end of the tail. The head is covered with yellow ſcales ſpeckled with red, and all its joints are of an orange colour; but the ſcales on the belly are of a reddiſh yellow. *Brookes's Nat. Hiſt.*

Acontias, in natural hiſtory, is a name applied to a kind of comet or rather meteor, with a roundiſh or oblong head, and a long ſlender tail reſembling a dart or javelin; whence it has its name.

ACOPIS, in natural hiſtory, a precious ſtone tranſparent like glaſs, and ſpotted with a gold colour. *Pliny.*

The word is Greek, and compounded of α, priv. and κοπος, labour; becauſe oil, in which it had been boiled, was conſidered, by the ancients, as a remedy againſt wearineſs or laſſitude.

ACOPOS, in botany, is the name of a plant mentioned by Pliny, who ſays it is the anagris of Dioſcorides, and which Gerard conſiders as a ſpecies of trefoil.

ACORN, the fruit of the oak. See the article Oak.

Acorn, a genus of ſhell fiſh, of which there are ſeveral ſpecies.

The ſhells of theſe fiſh are of a longiſh ſhape, reſembling that of an acorn, and compoſed of ſeveral valves from ſix to twelve in number; but not moveable like thoſe of the bivalve kind, being fixed to each other by an intermediate ſubſtance.

The great furrowed Acorn-Shell, *with a large mouth*, is the biggeſt of this kind, being about an inch and an half in height, and above an inch in diameter, where largeſt. It is broad at the baſe, and firmly fixed to a ſolid ſubſtance, and nearly of the ſame diameter at the top as at the baſe, where it is wide open. The mouth is not exactly round, nor the dyes even; it is compoſed of twelve valves, touching at the baſe, but receding from each other at the top. Theſe valves are furrowed longitudinally, and of a browniſh red; but the intermediate ſubſtance is of a lighter colour, and irregularly undulated in a tranſverſe direction. The inner ſurface is whitiſh, with a mixture of carnation and blue. The animal contained in this ſhell is of a triangular ſhape at the head, and has four pieces belonging to it, which ſerve to cloſe up the opening. It is found ſticking to the rocks in the Eaſt and Weſt-Indies.

The faſhioned Acorn-Shell, *with a large mouth*, is uſually found in great cluſters, fixed to each other at the tops, which makes the ſurface of the whole appear like net-work, but there are large cavities underneath between their bodies. The ſhell is narroweſt at the baſe, where it is fixed to a ſolid body, and from thence becomes gradually wider to the top, where it is broad, open, and bent a little down at the edge, ſo as to appear ſomewhat like the ſhape of a bell. It is compoſed of eight firm, hard portions of a conical ſhape, connected by a firm ſhelly ſubſtance. The colour is of a browniſh grey, and the intermediate matter of a deeper brown. Theſe ſhells are brought from the American iſlands.

The Low Acorn-Shell, *with a large mouth*, is three quarters of an inch high, and above half an inch in diameter. Theſe fiſh are found in large cluſters, and ſo cloſely connected, that the inner ſurface is more viſible than the outer. The colour of this ſhell is a pale whitiſh grey, with a mixture of brown, and a ſmall tinct of red. Each ſhell is compoſed of ſix parts, united together by a ſhelly ſubſtance. Theſe parts are full of furrows, and of a pale red, with a mixture of grey and brown. The ſhelly ſubſtance that unites them is of a paler red; and the largeſt part of the ſhell is near the baſe. The ſhape ſomewhat reſembles that of a drinking cup; whence it is, by ſome, called the cup-ſhell. It is found ſticking to the rocks and hard ſea plants on the American ſhores.

The narrow-mouthed oval and greyiſh-red Acorn-Shell, is uſually found in cluſters of twenty or more together. They do not all ſtand upright, but are very cloſe at the baſe. A ſingle ſhell is about half an inch long, and a third of an inch in diameter, but ſomewhat narrower at the baſe than elſewhere. The edges at the top are drawn inward, yet leave a ſmall opening or mouth. It conſiſts of twelve portions, connected by a very ſmall ſhelly ſubſtance. Theſe valves are deeply furrowed, and of a duſky grey colour, tinctured with a paliſh red. It is brought from the Eaſt Indies and America.

The narrow-mouthed ſlender Acorn Shell is three quarters of an inch high, and one third of an inch in diameter, where largeſt, which is a little lower than the middle. The baſe is ſomewhat ſmaller, and the top much more ſo; for the edge is ſo contracted as to render the mouth ſmall. It conſiſts of eight portions connected by a thinner ſubſtance, and appear like ſo many ribs, of a roundiſh ſhape, riſing conſiderably in the middle. The colour is of a browniſh grey; but the intermediate matter conſiderably paler. It is common in the Eaſt Indies and on the coaſt of Africa.

The purple narrow-mouthed and ſlender Acorn-Shell is three quarters of an inch high, and a little more than a third of an inch in diameter. It is largeſt at the baſe, from whence it grows gradually ſmaller to the top. Each ſhell is compoſed of ſix ribs, which touch each other at the baſe, and are connected by a thin ſhelly matter. The ribs are flatted with deep, but not regular, furrows, running longitudinally. The intermediate ſubſtance is undulated tranſverſly, and the edge ſo contracted as to form a narrow mouth. It is of a bright purple colour, though the ribs are deeper and more bluiſh, and the intermediate furrows more red.

The greyiſh-white furrowed ſlender Acorn-Shell is ſeldom more than a third of an inch long, and two thirds leſs in its diameter. It is broadeſt at the baſe, and narroweſt at the top, where there is a ſmall mouth. The colour is of a greyiſh white, and the ſhell exceeding thin. It is compoſed of ſix portions, running taper from the baſe to the top. The furrows extend longitudinally, and are moſt diſtinct near the top. The intermediate matter is tranſverſly and irregularly undulated. It is common on the Engliſh ſhores.

The ſlender Acorn-Shell, *with a narrow mouth*, is about half an inch in height, and hardly a quarter in diameter where largeſt, which is towards the middle, from whence it grows gradually ſmaller. The colour is of a duſky browniſh yellow on the ribs, and of a paler yellow between them. They are twelve in number, roundiſh and very narrow, ſtanding at ſmall diſtances from each other. It is brought from the Eaſt Indies, and is found ſticking to the bottom of the ſhips that come from thence. *Brookes's Natural Hiſt.*

ACORUS, in the materia medica, a name ſometimes given to the great galangal. See Galangal.

Acorus *Verus*, the true acorus. See Calamus *Aromaticus*.

Acorus *Adulterinus*, or Acorus *Vulgaris*. See Gladiolus *Lutius*.

ACOUSMATICI, in antiquity, a name given to thoſe diſciples of Pythagoras, who had not finiſhed their five years probation. See Pythagorean *Philoſophy*.

ACOUSTIC, an epithet applied to ſuch particulars as relate to the ear, or the ſenſe of hearing.

The word is formed from the Greek ακουστικος, and derived from ακουω, to hear.

Acoustic *Duct*, in anatomy, a name ſometimes given to the external paſſage of the ear. See Ear.

Acoustic *Inſtrument*, a ſort of tube reſembling in ſome meaſure a horn, the ſmaller end of which is placed in the ear, by which means the ſound is augmented, and acts with a greater force on the organ of hearing.

Acoustic *Medicines*, ſuch as are proper for the cure of deafneſs. See the article Deafness.

Acoustic *Nerve*, the ſame with auditorius, or the auditory nerve. See Auditorius.

ACQUEST, or Aquist, in law, implies ſuch goods as were acquired by purchaſe or donation; in contradiſtinction to ſuch as deſcended by inheritance.

ACQUIETANDIS *Plegiis*, in law, is a writ that lies for a ſurety againſt a creditor who refuſes to acquit the complainant after the debt is paid.

ACQUIETANTIA *de ſhiris & hundredis*, in law, ſignifies the privilege of being free from ſuit and ſervice in ſhires and hundreds.

ACQUITTAL, in law, implies a deliverance, or the freeing a perſon from the ſuſpicion of guilt.

Acquittal is alſo uſed to imply a freedom from

entire

entries and moleſtations of a ſuperior lord for ſervice iſſuing out of lands.

ACQUITTANCE, a releaſe or diſcharge in writing for a ſum of money, witneſſing that the party has paid the ſaid ſum.

No man is obliged to pay a ſum of money if the demandant refuſes to give an acquittance, which is a full diſcharge, and bars all actions, &c. An acquittance given by a ſervant for a ſum of money received for the uſe of his maſter, ſhall be a good diſcharge for that ſum, provided the ſervant uſed to receive his maſter's rents, debts, &c.

ACRAPITAMBA, in natural hiſtory, the name of a fiſh found on the coaſt of Braſil. It has an oblong body like a barbel, and grows to the length of two feet and better. The mouth is ſmall, furniſhed with teeth, and the eyes are large, with a red iris. The tail is about five inches long, and forked; and the ſcales are like thoſe of a carp, but of a blue purple colour. The lateral lines are of a gold colour, and an inch and half broad, running from the eyes to the tail: above theſe lines are golden ſpecks, and under them fine yellow lines running the whole length of the fiſh. The back fin and the tail appear as if they were gilded, but thoſe on the belly and ſides are of a whitiſh yellow. The fins ſhine remarkably in the night. *Brookes's Natural Hiſt.*

ACRASIA, among phyſicians, implies the predominancy of one quality above another, either with regard to artificial mixtures, or the humours of the human body.

The word is Greek, and compounded of *α*, priv. and *κεραννυμι*, to mix; q. d. not mixed in a juſt proportion.

ACRE, a meaſure of land, containing one hundred and ſixty ſquare poles or perches.

The word is formed from the Saxon *acher*, or the German *acker*, a field.

The French acre is equal to one and a quarter of the Engliſh; while that of Straſburg is only about one half of the latter.

The word acre did not originally ſignify a determined quantity of land, but any open ground, eſpecially a wide champaign: and in this antique ſenſe it ſeems to be preſerved in the names of places, as Caſtle-acre, Weſt-acre, &c. When the word was applied to the meaſure of ground, the quantity was various till the thirty-third year of Edward I. when it was determined by act of parliament.

Acre-Tax, a tax levied upon lands at a certain rate by the acre, otherwiſe called acre-ſhot.

ACRID, an epithet applied to ſuch things as are of a ſharp, pungent, diſagreeable taſte.

ACRIDOPHAGI, in antiquity, the inhabitants of a kingdom in Ethiopia, ſaid to have lived on locuſts.

The word is Greek, and compounded of *ακρις*, a locuſt, and *φαγω*. to eat.

ACRIMONY, that quality in things which renders them acrid.

Acrimony *of the Humours*, a malignant quality which the fluids of the human body often acquire from a great variety of cauſes; particularly from a ſtagnation, or too violent a motion.

ACRIVIOLA, in botany, the ſame with *naſturtium indicum*. See Nasturtium.

ACROAMATIC, or Acroatic, a name given to thoſe lectures of Ariſtotle, as were calculated for his favourite diſciples and intimate friends; in contradiſtinction to his exerotic lectures, which were adapted to common hearers.

The word is Greek, *ακροαματικος*, and derived from *ακροαμαι*, to hear.

Acroamatic is alſo uſed in a more general ſenſe for any thing that is ſublime or abſtruſe: thus we read of Acroamatic philoſophy, theology, &c.

ACROATIC. See Acroamatic.

ACROMION, in anatomy, is a name given to the epophiſe or upper part of the ſcapula, or ſhoulder-blade, produced by an eminence called epinus.

The word is Greek, and compounded of *ακρος*, extremity, and *ωμος*, the ſcapula.

ACRONYCAL, in aſtronomy, is an appellation given to the riſing of a ſtar above the horizon at ſun-ſet; or its ſetting at ſun-riſing; for, in either caſe, the ſtar is ſaid to riſe or ſet acronycal.

The word is Greek, and compounded of *ακρος*, extremity, and *νυξ*, the night.

ACROSPIRE, the vulgar name for what the botaniſts call the germ of a plant.

ACROSPIRED, in malt-making, is a term applied to ſuch grains of the barley as ſhoot or ſprout out both at the blade and root end. See Malt.

ACROSTIC, in poetry, a kind of poetical compoſition diſpoſed in ſuch a manner, that the initial letters of the verſes form the name of ſome perſon, kingdom, place, motto, &c.

The word is compounded of the Greek *ακρος*, extremity, and *ϛιχος*, verſe.

The acroſtic is conſidered by the critics as a ſpecies of falſe wit, and is therefore very little regarded by the moderns.

Acrostic is alſo a name given by ſeveral authors to two epigrams in the Anthologia, one of which is in honour of Bacchus, and the other of Apollo.

ACROSTICUM, in botany, is a name given by Linnæus to the ruta muraria of Tournefort, a diſtinct ſpecies of moſſes.

ACROSTOLIUM, among the ancients, ſignified the ornament placed on the extremity of the prows of their ſhips.

The word is Greek *ακροϛολιον*, and compounded of *ακρος*, extremity, and *ϛολος*, the prow.

ACROTERIA, in architecture, are ſmall pedeſtals upon which globes, vaſes, or ſtatues, are placed at the ends or center of pediments, or frontiſpieces. The height of the acroteria at the extremities ſhould be only one half of that of the tympanum; whereas that in the center ought to be one eighth more.

Acroteria alſo ſignify the figures placed as ornaments, or crownings on the tops of churches: and ſometimes thoſe ſharp pinnacles, ſtanding in rows about flat buildings, with rails and baluſters, are called acroteria.

ACT, in a general ſenſe, implies whatever is performed either by the body or mind.

The word is Latin, *actus*, and derived from *ago*, to perform.

Act, in dramatic poetry, ſignifies a certain diviſion, or part of a play, deſigned to give ſome reſpite both to the actors and ſpectators.

The Romans were the firſt that divided their theatrical pieces into acts; for no ſuch diviſions appear in the works of the firſt dramatic poets. Their pieces indeed conſiſted of ſeveral parts or diviſions, which they called protaſis, epitaſis, cataſtaſis, and cataſtrophe; but theſe diviſions were not marked by any real interruptions on the theatre. Nor does Ariſtotle mention any thing of acts in his Art of Poetry. But in the time of Horace all regular and finiſhed pieces were divided into five acts.

Neuve minor, neu ſit quinto productior actu
Fabula, quæ poſci vult & ſpectata reponi.

The firſt act, according to ſome critics, beſides introducing upon the ſtage the principal characters of the play, ought to propoſe the argument or ſubject of the piece: the ſecond to exhibit this to the audience, by carrying the fable into execution: the third to raiſe obſtacles and difficulties: the fourth to remove theſe, or raiſe new ones in the attempt: and the fifth to conclude the piece, by introducing ſome accident that may unravel the whole affair.

But is it really neceſſary that a dramatic piece ſhould conſiſt of neither more nor leſs than five acts? The abbé Vatry is of opinion, that ſome pieces may, with propriety, conſiſt only of three acts, and others even of more than five; becauſe it is no ways eſſential that a tragedy ſhould conſiſt of fifteen or ſixteen hundred verſes. Among the ancients we find ſome that have no more than a thouſand; and among the moderns, others which conſiſt of two thouſand. In the firſt caſe, three intervals or reſpites would be ſufficient; whereas in the ſecond, according to the opinion of the abbé d'Aubignac, five would not be enough: the diviſion into five acts is then an arbitrary rule, which may be violated without ſcruple. Tragedies, in general, ought indeed to conſiſt of five acts, and Horace had ſufficient reaſon to give a precept for that purpoſe; but it may be at the ſame time as neceſſary for a poet to divide his piece into three, four, or ſix acts, as to ſpin out uſeleſs acts, which were, perhaps, before too long and embarraſſed with epiſodes, or crouded with incidents not eſſential to the plot. M. Voltaire has already got the better of that ancient prejudice in his *Death of Cæſar*, which, though an excellent tragedy, conſiſts of no more than three acts; and we have, in the Engliſh language, ſome of the ſame kind no way inferior to M. Voltaire's.

Acts are divided into ſcenes; and Voſſius remarks, that, among the ancients, an act never contained more than ſeven ſcenes. We are very ſenſible that, in order to keep up a proper proportion between the length of the ſeveral acts, the number of ſcenes ſhould not be too much multiplied; but there is no fixed rule as to their number.

ACTS *of the Apoſtles*, one of the ſacred books of the New Teſtament, containing the hiſtory of the infant church, during the ſpace of twenty-nine or thirty years, from the aſcenſion of our Lord to the year of Chriſt 63.

It was wrote by St. Luke, and addreſſed to Theophilus, the perſon to whom that evangeliſt had before dedicated his Goſpel. We here find the accompliſhment of ſeveral of the promiſes made by our Saviour, his aſcenſion, the deſcent of the Holy Ghoſt, the firſt preaching of the apoſtles, and the miracles whereby their doctrines were confirmed; an admirable picture of the manners of the primitive chriſtians, and, in ſhort, every thing that paſſed in the church till the diſperſion of the apoſtles, who ſeparated themſelves, in order to propagate the Goſpel throughout the world. From the period of that ſeparation St. Luke quits the hiſtory of the other apoſtles, who were then at too great a diſtance from him, and confines himſelf more particularly to that of St. Paul, who had choſen him for the companion of his labours. He follows that apoſtle in all his miſſions, and even to Rome itſelf; for it appears that the Acts were publiſhed in the ſecond year of St. Paul's reſidence in that city, or the thirty-ſixth year of the chriſtian æra, and in the ninth or tenth of Nero's reign. The ſtile of this work, which was originally compoſed in Greek, is much purer than that of the other canonical writers; and it is obſervable, that St. Luke, who was much better acquainted with the Greek than with the Hebrew language, always in his quotations from the Old Teſtament, makes uſe of the Septuagint verſion. The council of Laodicea places the Acts of the Apoſtles among the canonical books, and all the churches have acknowledged it as ſuch without any controverſy.

ACT, in the univerſities, ſignifies a theſis maintained in public by a candidate for a degree, or to ſhew the capacity and proficiency of a ſtudent.

The candidates for a degree of bachelor and maſter of arts are to hold philoſophical acts; and thoſe for bachelor of divinity theological acts, &c.

At Oxford, the time when maſters or doctors complete their degrees is alſo called the *act*, which is held with great ſolemnity. At Cambridge they call it the *commencement*

ACT *of Faith*, in the Romiſh church, is a day appointed by the inquiſition for the puniſhment of heretics, and the abſolution of the innocent.

The criminals are firſt led to church, where their ſentence, either of condemnation or abſolution, is pronounced, and the criminals ſurrendered up to the ſecular power. This is the laſt ſcene of a court which is once a diſhonour to religion, and a diſgrace to humanity.

ACT, in philoſophy, an effective application of ſome power or faculty.

In this ſenſe, act ſtands oppoſed to power, or the capacity of acting, not the exertion of that capacity. The word act is indeed properly and primarily only applicable where the power might exiſt, without being exerted: but the ſchoolmen extend it further, defining it by the preſence of any power or perfection, even though it could not be abſent; in which ſenſe God himſelf is ſaid to be a moſt pure act, becauſe his perfections are always and neceſſarily preſent.

ACT, in logic, is particularly underſtood of an operation of the human mind.

Thus, to diſcern and examine are acts of the underſtanding; to judge and affirm are acts of the will.

There are voluntary and ſpontaneous acts; the former are produced by the operation of the ſoul; the latter without its privity or participation.

ACT *of Parliament* is a poſitive law, conſiſting of two parts, the words of the act, and its true ſenſe and meaning; which, being joined, make the law. The words of *Acts of Parliament* ſhould be taken in a lawful ſenſe. Caſes of the ſame nature are within the intention, tho' without the letter of the act; and ſome acts extend by equity to things not mentioned therein.

ACTIAN *Games*, in antiquity, were ſolemn games inſtituted, or at leaſt reſtored, by Auguſtus, in memory of the victory he obtained over Mark Anthony at Actium.

Stephanus, and ſome other authors after him, pretend that they were celebrated every three years; but the more general opinion, founded upon the teſtimony of Strabo, who lived in the time of Auguſtus, is, that they were held only every five years, and celebrated in honour of Apollo, ſince called Actius.

ACTIAN *Years*, in chronology, a ſeries of years, reckoned from the æra of the battle of Actium, otherwiſe called the æra of Auguſtus.

ACTION, in a general ſenſe, implies nearly the ſame thing with act. See ACT.

Grammarians, however, obſerve ſome diſtinction between *action* and *act*; the former being generally reſtricted to the common or ordinary tranſactions; whereas the latter is uſed to expreſs thoſe which are remarkable. Thus we ſay, it is a good *action* to comfort the unhappy; it is a generous *act* to deprive ourſelves of what is neceſſary for their ſake. The wiſe man propoſes to himſelf an honeſt end in all his *actions*; a prince ought to mark every day of his life with ſome *act* of greatneſs.

The abbé Girard makes a further diſtinction between the words *action* and *act*. The former, according to him, has more relation to the power that acts than the latter; whereas the latter has more relation to the effect produced than the former: and hence the one is properly the attribute of the other. Thus we may properly ſay, "Be ſure to preſerve a preſence of mind in all your "*actions*; and take care that they are all *acts* of equity."

ACTION, in mechanics, implies either the effort which a body or power makes againſt another body or power, or the effect itſelf of that effort.

As it is neceſſary in works of this kind to have a particular regard to the common language of mechanics and philoſophers, we have given this double definition: but the proper ſignification of the term is the motion which a body really produces, or tends to produce in another; that is, ſuch is the motion it would have produced had nothing hindered its effect.

All power is nothing more than a body actually in motion, or which tends to move itſelf; that is, a body which would move itſelf if nothing oppoſed it. The action therefore of a body is rendered evident to us by its motion only, and conſequently we muſt not fix any other idea to the word action, than that of actual motion, or a ſimple tendency to motion. The famous queſtion relating to *vis viva*, and *vis mortua*, owes, in all probability, its exiſtence to an inadequate idea of the word action; for had Leibnitz and his followers obſerved, that the only preciſe and diſtinct idea we can give to the word force or action, reduces it to its effect, that is, to the motion it actually produces or tends to produce, they would never have made that curious diſtinction. See FORCE.

Quantity of ACTION, a name given by M. de Maupertuis, in the Memoirs of the Pariſian Academy of Sciences for 1744, and in thoſe of Berlin for 1746, to the product of the maſs of a body by the ſpace which it runs through, and by its celerity. He lays it down as a general law, "that, in the changes made in the ſtate of a body, the "quantity of action neceſſary to produce ſuch change is "the leaſt poſſible." This principal he applies to the inveſtigation of the laws of refraction, of equilibrium, &c. and even to the ways of acting, employed by the

Supreme Being. In this manner M. de Maupertuis attempts to connect the metaphyſics of final cauſes with the fundamental truths of mechanics, to ſhew the dependence of the colliſion of both elaſtic and hard bodies upon one and the ſame law, which before had always been referred to ſeparate laws; and to reduce the laws of motion, and thoſe of equilibrium, to one and the ſame principle.

The ſame year that M. de Maupertuis communicated the idea of his principle, profeſſor Euler printed a work, entitled, *Methodus inveniendi lineas curvas maximi vel minimi proprietate gaudentes*; in a ſupplement to which he demonſtrates, that, in the trajectories which bodies deſcribe by central forces, the velocity multiplied by what the foreign mathematicians call the element of the curve, always makes a minimum, which is an application of the ſaid principle to the motion of the planets.

It appears from the Memoir of 1744, that it was the reflections of M. de Maupertuis on the laws of refraction which led him to the theorem here mentioned. The principle which M. de Fermat, and after him M. Leibnitz, made uſe of for accounting for the laws of refraction, is ſufficiently known. Thoſe mathematicians pretended that a particle of light in its paſſage from one point to another, through two mediums, in each of which it moves with a different velocity, muſt do it in the ſhorteſt time poſſible: and, upon this principle, they have demonſtrated, by geometry, that the particle cannot go from one point to the other in a right line; but, having reached the ſurface which ſeparates the two mediums, it muſt alter its direction in ſuch manner, that the ſine of its incidence ſhall be to the ſine of its refraction, as its velocity in the firſt medium is to its velocity in the ſecond; whence they deduced the well known law of the conſtant ratio of the ſines. See Sine and Refraction.

This explanation, though very ingenious, is liable to one great difficulty, namely, that the particle muſt approach towards the perpendicular in that medium where its velocity is the leaſt, and conſequently reſiſts it the moſt, which ſeems contrary to all the mechanical explanations of the refraction of bodies hitherto advanced, and of the refraction of light in particular. Sir Iſaac Newton's method of accounting for it is the moſt ſatisfactory of any hitherto offered, and gives a clear reaſon of the conſtant ratio of the ſines, by aſcribing the refraction to the attractive force of the mediums: whence it follows, that the denſeſt mediums, whoſe attraction is the ſtrongeſt, ſhould cauſe the ray to approach the perpendicular; a fact confirmed by experiment. Now the attraction of the medium could not cauſe the ray to approach towards the perpendicular, without increaſing its velocity, as may be eaſily demonſtrated. According to Newton, therefore, the refraction muſt be towards the perpendicular when the velocity is increaſed, which is contrary to the law of de Fermat and Leibnitz.

M. de Maupertuis has attempted to reconcile Sir Iſaac Newton's explanation with metaphyſical principles. Inſtead of ſuppoſing, as the above gentlemen do, that a particle of light proceeds from one point to another in the ſhorteſt time poſſible, he aſſerts that a particle of light paſſes from one point to another, in ſuch a manner, that the quantity of action is the leaſt poſſible. This quantity of action, ſays he, is a real expence in which nature is always frugal. In virtue of this philoſophical principle, he diſcovers, that not only the ſines are in a conſtant ratio, but alſo that they are in the inverſe ratio of the velocities (agreeable to Sir Iſaac's explanation), and not in the direct ratio, as had been pretended by de Fermat and Leibnitz.

It is remarkable that of the many philoſophers who have treated on the ſubject of refraction, none ſhould fall upon ſo ſimple a manner of reconciling metaphyſics with mechanics; ſince no more is neceſſary than the making a ſmall alteration in the calculus founded upon M. de Fermat's principle. In reality, according to that principle, the time, that is, the ſpace divided by the velocity, ſhould be a minimum: ſo, calling the ſpace run through in the firſt medium S, with the velocity V, and the ſpace run through in the ſecond medium s, with the velocity v, we ſhall have $\frac{S}{V} + \frac{s}{v} =$ a minimum; that is, $\frac{\dot{S}}{V} + \frac{\dot{s}}{v} = 0$. Now it is eaſy to perceive, that the ſines of incidence and refraction, are to each other as $\dot{S}$ to $-\dot{s}$; whence it follows, that thoſe ſines are in the direct ratio of the velocities V, v, which is agreeable to M. de Fermat's rule. But, in order to have thoſe ſines to be in the inverſe ratio of the velocities, it is only ſuppoſing $\dot{V} S + \dot{v} s = 0$, which gives $S \times V + s \times v =$ a minimum. See Minimum.

In the Memoirs of the academy of Berlin, above cited, may be ſeen the other applications M. de Maupertuis has made of this principle. And we will add, that whatever may be determined with regard to the metaphyſical baſis of this principle, and even to the conception he has annexed to the quantity of action, it will ſtill hold good, that the product of the ſpace by the velocity is a minimum in the moſt general laws of nature.

Action, in poetry, is the ſubject or fable of the poem.

Critics generally diſtinguiſh two kinds, the *principal*, and the *incidental*. The principal action is what is generally called the fable, and the incidental an epiſode. See Episode.

As poems are divided into epic and dramatic, ſo each of theſe has alſo its particular action. That of the dramatic poem ought to be one, intricate, unravelled, and complete; but at the ſame time much ſhorter than that of an epic poem.

The action of an epic poem ought to be great, one, entire, marvellous, and of a competent duration.

Firſt, it ought to be great, that is, noble and intereſting; a common, ordinary adventure not furniſhing, from its own ſtock, the inſtructions intended to be conveyed by an epic poem. The action muſt be important and heroic. Thus, in the Æneid, a hero eſcaped from the ruins of his country, wanders a long time with the remainder of his fellow citizens, who had choſe him for their leader, and, in ſpight of Juno's anger, who purſues him without intermiſſion, he arrives in a country which the Fates had promiſed him; defeats very formidable enemies; and, after ſurmounting a thouſand difficulties, with a ſagacity equal to his valour, he there lays the foundation of a powerful empire. Thus the conqueſt of Jeruſalem by the Cruſaders; that of the Indies by the Portugueze; and the reduction of Paris by Henry the Great, in ſpight of the utmoſt efforts of the League, are the ſubjects of the poems of Taſſo, Camoëns, and M. de Voltaire: whence it is eaſy to conclude, that a common ſtory, an amorous intrigue, or ſome other ſimilar adventure, which affords a foundation for romances, can never become the fable of an epic poem; becauſe it requires nobleneſs and majeſty in the ſubject.

There are two methods of rendering the epic action intereſting: firſt, by the dignity and importance of the perſonages; this is the artifice of Homer, who has nothing elſe important in his models; every other particular might happen to common perſons. The ſecond is the importance of the action in itſelf, as the eſtabliſhment or abolition of ſome religion or ſtate; ſuch is the ſubject choſen by Virgil, and in this he doubtleſs excels Homer. The action of the Henriade reunites, in a pleaſing manner, this double advantage. But Milton, in both particulars, excels them all.

F. le Boſſu adds a third method for rendering the action intereſting, viz. the giving the readers an higher idea of the perſonages of the poem than what they commonly entertain of mankind; and by comparing the heroes of the poem with the preſent race of mortals.

The action ought to be one, that is, the poet ought to confine himſelf to one ſingle illuſtrious enterprize, executed by his hero, and not take the whole hiſtory of his life. The Iliad is no more than the hiſtory of the anger of Achilles, and the Odyſſey that of Ulyſſes's return to Ithaca. Homer would neither deſcribe the entire life of the latter, nor the whole of the Trojan war. On the contrary, Statius, in his Achilleid, as well as Lucan in his Pharſalia, has heaped together too many ſingle events, in order to give their works the name of epic poems. They may indeed be called heroic, becauſe they treat of heroes; but we muſt be careful not to confound the unity of the hero with the unity of the action. The life of man is full of inequality, and his deſigns inceſſantly changing, either from the inconſtancy of his paſſions, or the unforeſeen accidents of life. He who would deſcribe the whole man would form but an odd picture, a contraſt of oppoſite paſſions, without either order or connection. Epic poetry therefore is not the praiſe of an hero, whom we propoſe as a model, but the recital of ſome great and illuſtrious action, which is given as an example.

It is the ſame of poetry as in painting; the unity of the principal action does not hinder us from introducing ſeveral particular incidents, and thoſe incidents are called epiſodes. The deſign is formed from the beginning of the poem; the hero of it attains his end by ſurmounting every obſtacle; and it is the recitals of thoſe oppoſitions which make the epiſodes. However, all thoſe epiſodes depend upon the principal action, and are ſo connected with it, and ſo united with each other, that we never loſe ſight either of the hero or the action which the poet propoſes to celebrate; at leaſt, we ought inviolably to purſue that rule, if we intend to preſerve the unity of the action.

As to the integrity or entireneſs of the action, it muſt, according to Ariſtotle, have a beginning, a middle, and an end; a precept which, though in itſelf very obſcure, is explained by F. le Boſſu in the following manner: the beginning, ſays he, comprehends thoſe cauſes which influence the action, and the reſolution that ſome perſon takes to perform it; the middle is the effect of thoſe cauſes, and the difficulties which attend their being carried into execution; and the end is the unravelling and ceſſation of thoſe difficulties.

The poet, adds the ſame author, ſhould begin his action in ſuch a manner as to enable the reader to underſtand whatever is to follow; and the rather, as ſuch a beginning neceſſarily requires a ſequel. Theſe two principles, taken reverſely, may likewiſe ſerve for the end; that is, the end muſt leave nothing to be expected, and neceſſarily be the ſequel of ſomething which went before. In ſhort, the beginning muſt be connected with the end by means of the middle, which is the effect of ſomething that preceded it, and the cauſe of that which follows.

Two oppoſite plans are remarkable in the cauſes of an action. The firſt, and principal, is that of the hero; the ſecond comprehends the deſigns which oppoſe his project. Thoſe oppoſite cauſes likewiſe produce contrary effects, viz. endeavours on the hero's part to execute his plan, and contrary efforts on the part of thoſe who oppoſe him. As the cauſes and deſigns, both of the hero and the other perſonages of the poem, make the beginning of the action; ſo the contrary efforts make the middle of it, when the knot or intrigue is formed, and in which the greateſt part of the poem conſiſts.

The removing of the obſtacles conſtitutes the unravelling; and this unravelling may be brought about two ways, either by an acknowledgment, or without it, though the latter takes place only in tragedy: whereas in an epic poem, the different effects produced by the unravelling, and the different conditions in which it leaves the perſonages of the poem, divide the action into ſo many branches. If it alters the fate of the principal perſonages, we ſay there is a peripetia, and then the action is complicated: if there be no peripetia, and the unravelling worked up by paſſing from a ſtate of trouble to a ſtate of repoſe, we ſay, the action is ſimple.

The action of an epic poem ought to be marvellous; that is, full of bold actions, which have however an air of probability. Such is the intervention of heathen deities in the poems of the ancients, and that of the paſſions perſonified in thoſe of the moderns. But tho' the poet may ſometimes go beyond nature, he ought never to ſhock reaſon. An action may be either ſagaciouſly or ridiculouſly marvellous.

With regard to the duration of the action of an epic poem, Ariſtotle obſerves, that it is leſs confined than that of tragedy. The latter ought to be included in the ſpace of one day, or, as they ſay, between two ſuns; but an epic poem is not confined in reſpect to time. In fact, tragedy is replete with violent paſſions, and nothing that is violent can be of long duration; but virtues and habitudes, which are not acquired inſtantaneouſly, are proper for an epic poem, and conſequently its action ought to have a greater extent. F. le Boſſu lays it down as a rule, that the more violent the paſſions of the principal perſons are, the leſs time the action ought to laſt; and conſequently that the action of the Iliad, the ſoul whereof is Achilles's anger, laſts but ſeven and forty days; whereas that of the Odyſſey, where prudence is the prevailing quality, laſts eight years and a half; and that of the Æneid, where the principal perſonage is a pious and humane hero, nearly ſeven years.

But the rule of the above author is not inconteſtable, nor are his ſentiments either with regard to the duration of the Odyſſey, or that of the Iliad exact; for though the epopee may include in its narration the actions of ſeveral years, yet the critics are generally of opinion, that the time of the principal action, from the place where the poet begins his narration, ſhould not be longer than one year, as the time of the action of a tragedy ought to be at moſt but one day. Ariſtotle and Horace, however, ſay nothing of this matter; but the examples of Homer and Virgil prove it. The duration of the Iliad is but forty-ſeven days: the Odyſſey does not commence till the departure of Ulyſſes from the iſland of Ogygia; and the Æneid at the tempeſt which threw Æneas upon the coaſt of Carthage. Now, reckoning from theſe two epochs, the action of the Odyſſey is but of two months continuance, and that of the Æneid one year. It is true that Ulyſſes, while with Alcinous, and Æneas, while he ſtays with Dido, relate their paſt adventures; but theſe recitals are introduced merely as ſuch, in the duration of the principal action, and the courſe of years which were taken up by thoſe events make no part of the duration of the poem; as in tragedy, the events related in the protaſis, and which only tend to explain the dramatic action, make no part of its duration: therefore the error of F. le Boſſu is ſufficiently evident.

Actions, in ethics, are the voluntary actions of a man, conſidered in reſpect to the imputation of their effects in common life.

By voluntary actions we underſtand thoſe which depend upon the human will, conſidered as a free agent, without whoſe determination, cauſed by ſome of its immediate acts, and preceded by the knowledge of the underſtanding, they cannot be performed; and conſequently the exiſtence or non-exiſtence of them is in the power of every perſon.

Every voluntary action includes two particulars; the matter of the action, and its form. The firſt is the motion itſelf of the natural faculty, or the actual uſe of that faculty conſidered wholly in itſelf; the other is the dependence, or that motion of a decree of the will, in virtue whereof we conceive the action, as produced by a free cauſe, capable of determining itſelf. The actual uſe of the faculty, wholly conſidered in itſelf, ſhould be rather called the action of the will than a voluntary action; the latter being aſſigned only to the motion of the faculties, conſidered as dependant on a free determination of the will: but we likewiſe conſider voluntary actions, either abſolutely, or in themſelves, as phyſical motions, though produced by a decree of the will, ſo far as their effects may be imputed to man. When voluntary actions include, in their ideas, that reflected view, we call them human actions; and a perſon is ſaid to be moral or immoral, according as the actions have either a good or bad tendency, that is, according as they agree or diſagree with the law, which is their rule. And hence human actions have likewiſe the title of morals, or moral actions.

Human actions, conſidered in the latter acceptation, include, in their eſſence, two particulars; their matter, and their form. The matter comprehends ſeveral particulars, as,

1. The phyſical motion of one of the natural faculties; for inſtance, of the motive faculty of the ſenſitive

appetite, of the exterior and interior ſenſes, &c. We might alſo place in this claſs the acts of the will themſelves, conſidered purely and ſimply in their natural exiſtence, ſo far as they are the effects flowing from a phyſical faculty.

2 The defect of ſome phyſical motion it is capable of producing; for we are equally obnoxious and puniſhable for the ſins of omiſſion as for thoſe of commiſſion.

3. It is not only our proper motions and habitudes, or the abſence of either in our own perſon, that can conſtitute the matter of our moral actions; but alſo the motions, the habits, and their abſence, which we find in others, provided the whole could and might be directed by our own will.

4. It is not the action of beaſts, or the operations of vegetables, and inanimated bodies in general, that can furniſh the matter of any moral action, ſince theſe ſpecies of beings are ſuſceptible of being directed by our will; and hence we ſee the reaſon why the owner of an ox that puſhes with his horns, was, by the Levitical law, obliged to make good the damage done by that beaſt, provided the owner was previouſly appriſed of the vicious nature of the creature.

5 The actions of another, of which we are the paſſive ſubject, may be the cauſe of a moral action, at leaſt ſo far as we have given room to commit ſuch action. Thus a woman, who has been violated, is conſidered as in ſome degree culpable, if ſhe imprudently expoſed herſelf by going to places where ſhe had no real buſineſs, and by that means put herſelf into the power of the raviſher.

The eſſence therefore of moral actions conſiſts in their imputability, if we may be allowed to apply that term to the quality whereby the effects of voluntary actions may be imputed to the agent as their author; and hence the agent is called the moral cauſe.

ACTION, in the military art, implies an engagement between two armies, or between two different bodies of troops. It is alſo uſed to ſignify ſome memorable act performed by ſome officer or commander.

ACTION, in law, denotes either the right of demanding, in a legal manner, what is any man's due; or the proceſs brought for recovering the ſame.

ACTIONS are either criminal or civil.

Criminal ACTIONS are to have judgment of death, as appeals of death, robbery, &c. or only judgment for damage to the injured, fine to the king, and impriſonment.

Under the head of criminal actions may likewiſe be ranked penal actions, which lie for ſome penalty or puniſhment on the party ſued, whether it be corporal or pecuniary.

Alſo actions upon the ſtatute, brought on breach of any ſtatute, or act of parliament, by which an action is given that did not lie before; as where a perſon commits perjury to the prejudice of another, the injured party ſhall have an action upon the ſtatute. And laſtly, popular actions, ſo called, becauſe any perſon may bring them on behalf of himſelf and the crown, by information, &c. for the breach of ſome penal ſtatute.

Civil ACTIONS are divided into real, perſonal, and mixt.

Real ACTION is that whereby a man claims a title, lands, tenements, &c. in fee, or for life; and this action is either poſſeſſory, or anceſtral; poſſeſſory, where the lands are a perſon's own poſſeſſion or ſeiſin; anceſtral, when they were in the poſſeſſion or ſeiſin of his anceſtors.

Perſonal ACTION, is that brought by one man againſt another, upon any contract for money or goods, or on account of treſpaſs, or other offence committed; and thereby the debt, goods, chattels, &c. claimed.

Mixt ACTION, one lying as well for the thing demanded as againſt the perſon who has it; and on which the thing is recovered with damages for the wrong ſuſtained: ſuch is an action of waſte ſued againſt a tenant for life, the place waſted being recoverable, with treble damages, for the wrong done.

All actions ſeem to be temporary. A real action may be preſcribed againſt in five years after a fine levied, or recovery ſuffered. Writs of formedon for any title to lands in being, muſt be ſued out within twenty years. Actions of debt, account, detinue, trover, and treſpaſs, are to be brought within ſix years; of aſſault and battery within four years; and of ſlander within two years, after cauſe of action, and not afterwards. However, it ought to be obſerved, that the right of action in theſe caſes is ſaved to infants, feme coverts, and perſons in priſon, or beyond ſea, &c. ſo as they commence their ſuits within the time limited after their imperfections are removed.

Actions may be brought againſt all perſons whatever; but thoſe who are attainted of high treaſon or felony, or outlawed or excommunicated perſon, &c. cannot bring any action till pardoned, abſolved, &c. A feme covert muſt ſue with her huſband, and infants by their guardians.

ACTION *upon the Caſe*, a general action which lies for the redreſs of wrongs and injuries done without force, and which, by law, are not provided againſt.

This at preſent is the moſt frequent of all actions, being brought in all caſes where no certain form has been eſtabliſhed; and the reaſon why it is called an action upon the caſe, is becauſe the whole cauſe or caſe is ſet forth in the writ. It may be brought as well where there is another action, as where no other lies.

ACTION *upon the Caſe for Words*, is brought where a perſon is injured in his reputation; and for words which affect the life, office, trade, &c. or tend to the loſs of preferment in marriage, or otherwiſe; or to the diſinheritance or other damage of a perſon.

Prejudiced ACTION, otherwiſe called *preparatory*, one which ariſes from ſome doubt in the principal; as, where one ſues his younger brother for lands deſcended from the father, on which it is objected to him that he is a baſtard: here this point of baſtardy is to be firſt tried or adjudged before the principal cauſe can proceed.

ACTION *of a writ*, is when a perſon pleads ſome matter by which is ſhewn, that the plaintiff had no cauſe to have the writ brought, though, perhaps, he may have another writ for the ſame matter. It is hence called a plea to the action of the writ, in contradiſtinction from a plea to the action.

ACTION, among phyſicians, is applied to the functions of the human body, whether vital, animal, or natural.

Vital actions are thoſe without which life could not be maintained. Such is the motion of the heart and lungs.

Under animal actions are comprehended the ſenſes, imagination, judgment, and voluntary motions, without which we could not live comfortably.

Laſtly, natural actions are thoſe, which, though not ſo immediately neceſſary to life but that we may live ſome time at leaſt without them, yet are abſolutely neceſſary to our well being: ſuch is digeſtion.

ACTION, in commerce, is a term uſed abroad for a certain part or ſhare of a public company's capital ſtock. Thus, if a company has 400000 livres capital ſtock, this may be divided into 400 actions, each conſiſting of 1000 livres. Hence a man is ſaid to have two, four, &c. actions, according as he has the property of two, four, &c. thouſand livres, capital ſtock.

The tranſferring of actions abroad is performed much in the ſame manner as ſtocks are with us. See STOCKS.

ACTION, in oratory, implies the expreſſion of the countenance, voice, geſture, &c. and which ought to be accommodated to the ſubject.

Action, ſays Cicero, is the eloquence of the body; it has two parts, the voice and the geſture; the one ſtrikes the ears, and the other the eyes; the two ſenſes, adds Quintilian, whereby we convey our ſentiments and paſſions into the ſouls of the hearers. Each paſſion has a tone of voice, an air and a geſture peculiar and proper to it.

The ancients uſed the word pronunciation in the ſame ſenſe; and this Demoſthenes conſidered as the ſecond requiſite in eloquence, laying it down as an acknowledged truth, that a middling diſcourſe, delivered with all the force and graces of action, will have a greater effect on the audience than the moſt eloquent diſcourſe deſtitute of that powerful charm.

Action, in horſemanſhip, implies the motion of the various parts of a horſe in doing his paces, &c.

Action *of the Mouth*, in horſemanſhip, ſignifies the motion of a horſe's mouth in champing on his bit, whereby he throws out a great deal of foam, which keeps his mouth always freſh. It is a mark of fire and vigour.

Action, in painting and ſculpture, is the attitude or poſition of the ſeveral parts of the face, body, and limbs of ſuch figures as are repreſented, and whereby they ſeem to be really actuated by paſſions. Thus we ſay, the action of ſuch a figure finely expreſſes the paſſions with which it is agitated : we alſo uſe the ſame expreſſion with regard to animals.

ACTIONARY, or Actionist, ſignifies the proprietor of an action, or of a ſhare in the foreign funds, or capital ſtock of a company.

ACTIVE, an epithet applied to that body or power which communicates motion to another: and in this acceptation the term *active* is oppoſed to *paſſive*.

Sir Iſaac Newton juſtly obſerves that the vis inertiæ, &c. of all bodies muſt have a tendency to diminiſh the quantity of motion in the univerſe ; and conſequently that there is a neceſſity for certain active principles to recruit it : among which he places the cauſes of gravity and fermentation. He adds that we find very little motion in the univerſe that does not flow from theſe principles ; and, as the cauſe of gravity always ſubſiſts without being in the leaſt diminiſhed by a continual exertion of its force, it becomes a perpetual ſource of action.

Active *Principles*, in chemiſtry, are thoſe ſuppoſed to act of themſelves, without any neceſſity for the action of others.

The chemiſts, in general, diſtinguiſh the principles of bodies into *active* and *paſſive*. The former are ſpirit, oil, and ſalt ; and thoſe of the latter, water and earth. But we can by no means admit of this diſtinction ; becauſe, as thoſe principles are merely relative, they may become active in ſome reſpects, and paſſive in others. Nor does there appear the leaſt reaſon for placing water in the claſs of paſſive principles. Mr. Homberg, and ſeveral other chemiſts, make only one active principle, namely, ſulphur or fire, which they aſſert to be the ſource of every action in the univerſe. See Fire.

Active, in medicine, is applied to ſuch remedies as have a quick and lively action, or which exert their force ſuddenly and with vigour.

Active, in grammar, is applied to ſuch words as expreſs an action ; and is therefore oppoſed to paſſive. The active performs the action as the paſſive receives it. The fire *burns*, and the wood is *burned*. *Burns* is therefore an *active*, and *burned* a *paſſive* term.

Verbs are divided into active and paſſive : the former implies that the ſubject of the verb performs the action, as *I love* ; and the latter that the ſubject receives the action, as *I am loved*.

We ſay that verbs have an active and a paſſive voice ; that is, a ſucceſſion of terminations which expreſs an active ſenſe, and another ſeries of terminations that imply a paſſive ſenſe. This is undoubtedly juſt with regard to the Greek and Latin languages ; but the Engliſh verbs have only an active voice, and it is by means of a periphraſis, and not by the aſſiſtance of a particular termination, that we expreſs a paſſive ſenſe.

ACTIVITY, the power of acting, or the active faculty.

Sphere of Activity, is that ſpace through which any body extends its virtue or influence.

ACTIUS, in mythology, is a ſirname of Apollo, from Actium, where he was worſhipped.

ACTOR, in a general ſenſe, implies every perſon that acts.

Actor, with regard to the Theatre, ſignifies a perſon who plays a part, or repreſents ſome perſon or character, in a dramatic performance. The women are called actreſſes, but comprehended under the general name of actors.

The drama conſiſted originally of nothing more than a ſimple chorus, who ſung hymns in honour of Bacchus ; ſo that the primitive actors were only ſingers and muſicians.

Theſpis was the firſt that, in order to eaſe this unformed chorus, introduced a declaimer, who repeated ſome heroic or comic adventure. Eſchylus, finding a ſingle perſon tireſome, attempted to introduce a ſecond, and changed the ancient recitals into dialogues. Before his time, the actors daubed themſelves with the dregs of wine, and, being drawn upon a tumbrel, amuſed the ſpectators. Eſchylus was the firſt projector of theatres. He alſo dreſſed his actors in a more majeſtic manner, and introduced the cothurnus or buſkin.

Sophocles added a third, in order to repreſent the various incidents in a more natural manner : and here the Greeks ſtopped ; at leaſt we do not find in any of their tragedies above three perſons in the ſame ſcene ; perhaps they looked upon it as a rule of the dramatic poem never to admit more than three ſpeakers at a time on the ſtage ; a rule which Horace has expreſſed in the following verſe :

Nec quarta loqui perſona laboret.

This however did not prevent their increaſing the number of actors in comedy. Before the opening of a play, they named their actors in full theatre, together with the parts they were to perform. The moderns have ſometimes brought a greater number of actors upon the ſtage, in order to increaſe the buſineſs by the variety of perſons ; but this has often occaſioned a confuſion in the conduct of the piece.

The ancient actors were maſked, and obliged to raiſe their voice extremely, in order to make themſelves heard by the innumerable croud of people who filled the amphitheatres : they were accompanied with a player on the flute, who played a prelude, gave them the tone, and played while they declaimed.

Actors were highly honoured at Athens, and deſpiſed at Rome, where they were not only denied all rank among the citizens, but even when any citizen appeared upon the ſtage, he was expelled his tribe, and deprived of the right of ſuffrage by the cenſors Cicero, indeed, eſteems the talents of Roſcius, but he values his virtues ſtill more ; virtues which diſtinguiſhed him ſo remarkably above all others of his profeſſion, that they ſeemed to have excluded him from the theatre. The French have, in this reſpect, adopted the ſame ideas of the Romans ; and the Engliſh thoſe of the Greeks.

Actor, in law, implies the proctor or advocate in civil courts or cauſes.

ACTORUM *Tabulæ*, in ancient hiſtory, were tables inſtituted by Servius Tullius, in which the births of children were regiſtered. They were kept in the treaſury of Saturnus.

ACTRESS, a woman who performs or acts ſome character on the ſtage.

ACTUAL, an epithet applied to ſuch things as truly and abſolutely ſubſiſt. Thus philoſophers uſe the terms actual heat, actual cold, &c. in oppoſition to virtual or potential ; and divines, that of actual grace in oppoſition to habitual. See Heat, Cold, Grace, &c.

Actual *Sin*, that which is committed by the perſon himſelf, in oppoſition to original ſin, or that he contracted from being a child of Adam

ACTUARIÆ *Naves*, in antiquity, were a kind of ſhips deſigned principally for ſwift ſailing.

ACTUARY, or Actuarius, a clerk whoſe buſineſs it is to regiſter the acts and conſtitutions of the convocation.

Among the ancient Romans the actuary was a notary, ſcribe, or clerk, who kept an account of the proviſions and corn delivered out to each ſoldier.

ACTUS, among the ancient architects, ſignified a meaſure in length equal to 120 Roman feet.

Actus, in ancient agriculture, implied the length of one furrow, or the diſtance a plough goes before it turns.

Actus *Minimus*, ſignified a quantity of land 120 feet in length, and four in breadth, equal to one fourth of the jugerum.

Actus *Major*, or Actus *Quadratus*, was a piece of ground in the form of a ſquare, whoſe ſide was equal to 120 feet, equal to half the jugerum.

Actus *Intervicenalis* implied a ſpace of ground four feet in breadth, left between the lands as a path or way.

ACUANITES, in eccleſiaſtical hiſtory, is the name given to one of the branches of the Manichees. See Manichees.

ACULEI, in natural hiſtory, the ſpines or prickles found upon ſeveral objects both in the animal and vegetable kingdom.

ACULER, in the manege, is ſaid of a horſe when in working upon volts, he does not go far enough forward at every motion, by which means his ſhoulders take up too little ground, and his croupe comes too near the center of the volt.

ACUS, in natural hiſtory, the name of two diſtinct genuſes of fiſhes, one called, in Engliſh, the needle or tobacco-pipe fiſh, and the other the gar-fiſh.

The former is about a foot and a half in length, but not thicker than a man's finger. It has two very ſmall fins near the gills and another on the back. See plate I. *fig.* 14.

The latter, often called the acus of Oppian, is alſo long and ſlender, and the back of a bluiſh green colour. The under mandible is longer than the upper, and both furniſhed with ſharp teeth. See plate I. *fig.* 15.

ACUTE, an epithet applied to ſuch things as terminate in a ſharp point or edge. And in this ſenſe it ſtands oppoſed to obtuſe.

The word is derived from the Greek ακη, a point or edge.

Acute *Angle*, in geometry, is that which is leſs than a right angle. See Angle.

Acute-Angled *Triangle*, is a triangle whoſe three angles are all acute.

Acute-Angled *Cone* is, according to the ancients, a right cone, whoſe axis makes an acute angle with its ſide.

Acute-Angled *Section of a Cone*, among the ancients, ſignified an ellipſis formed by a plane cutting an acute-angled cone. But Appollonius demonſtrated that ſuch a ſection might be made in any cone whatever.

Acute, in muſic, is applied to a ſound or tone that is ſharp or high, in compariſon of ſome other tone. In this ſenſe, *acute* ſtands oppoſed to *grave*.

Acute *Accent*. See the article Accent.

Acute *Diſeaſe*, among phyſicians, is that which moves with velocity to a criſis, and is attended with danger; and in this ſenſe *acute* ſtands oppoſed to *chronical*.

AD, in grammar, a Latin prepoſition, expreſſing the relation one thing bears to another. It is frequently uſed in the compoſition of Engliſh and French words, as well as thoſe of the Latin.

ADAGE, a proverb, or popular ſentence, containing ſome remarkable obſervation.

The word is formed from the Latin *adagium*, which, according to Scaliger, is compounded of *ad*, and *agor*.

Eraſmus has made a very large and valuable collection of the Greek and Roman adages; and Mr. Ray has done the ſame with regard to the Engliſh.

ADAGIO, in muſic, ſignifies the firſt and ſloweſt of the four principal degrees of time eſtabliſhed in the Italian muſic. When it is repeated, it ſignifies ſtill ſlower time.

The word is an Italian adverb, and ſignifies ſlowly, leiſurely, &c.

ADAMANT, a name given by ſome naturaliſts to the diamond. See the article Diamond.

ADAMI *Pomum*, Adam's apple; in anatomy, a protuberance in the fore part of the throat.

Adami *Pomum*, in botany, the name of a ſpecies of orange common in Italy.

ADAMICA *Terra*, in natural hiſtory, a ſalt, glutinous, fat, and mucilaginous ſubſtance, reſembling a jelly, found at the bottom of the ſea.

ADAMITES, in eccleſiaſtical hiſtory, the name of a ſect of ancient heretics, ſuppoſed to have been a branch of the Baſilidians and Carpocratians.

Epiphanius tells us, that they were called Adamites from their pretending to be re-eſtabliſhed in the ſtate of innocence, and to be ſuch as Adam was at the moment of his creation, whence they ought to imitate him in his nakedneſs. They deteſted marriage, maintaining that the conjugal union would never have taken place upon earth had ſin been unknown; and that the privilege of enjoying women, in common, was one of the rights which flowed from their eſtabliſhment in original purity.

This obſcure and deteſtable ſect did not at firſt laſt long; but it was revived in the twelfth century by one Tandamus, ſince known by the name of Tanchelin, who propagated his errors at Antwerp, in the reign of the emperor Henry V. He maintained that there ought to be no diſtinction between prieſts and laymen; and that fornication and adultery were meritorious actions. Tanchelin had a great number of followers, and was conſtantly attended by three thouſand of theſe profligates in arms. His ſect did not however continue long after his death: but another appeared under the name of Turlupins, in Savoy and Dauphiny, where they committed the moſt brutal actions in open day.

About the beginning of the fifteenth century, one Picard, a native of Flanders, ſpread theſe errors in Germany and Bohemia, particularly in the army of the famous Ziſca, notwithſtanding the ſevere diſcipline he maintained. Picard pretended that he was ſent into the world as a new Adam, to re-eſtabliſh the law of nature; and which, according to him, conſiſted in expoſing every part of the body, and having all the women in common. This ſect found alſo ſome partizans in Poland, Holland, and England: they aſſembled in the night; and it is aſſerted, that one of the fundamental maxims of their ſociety was contained in the following verſe:

Jura, perjura, ſecretum prodere noli.

Some learned men are of opinion, that the origin of the Adamites was much earlier than the eſtabliſhment of Chriſtianity, being perſuaded that Maacha, mother of Aſa, king of Judah, was high prieſteſs of Priapus; and that, in the nocturnal ſacrifices which the women performed to that obſcene idol, they appeared ſtark naked. But however that be, the motives of the Adamites were very different from thoſe of the votaries of Priapus; for they borrowed from paganiſm only the ſpirit of debauchery, not the worſhip of that heathen god.

ADAPTERS, or Adopters, among chemiſts, are veſſels in the form of hollow globes, having two mouths or apertures diametrically oppoſite to each other; one of which admits the neck of the retort; and the other is received, either by the mouth of another adopter, or into the mouth of the receiver.

ADAR, the name of the twelfth month of the eccleſiaſtical, and the ſixth of the civil year among the Hebrews. It conſiſts of twenty-nine days, and anſwers to the latter end of our February and the beginning of March.

The Jews faſt on the ſeventh of this month, on account of the death of Moſes; on the thirteenth in imitation of the Jews of Suſa, who then faſted to avert the evils with which they were threatened by Haman; on the fourteenth they celebrate the feaſt of Purim, in commemoration of their deliverance from the intended cruelty of Haman.

As the lunar year, which the Jews followed in their calculations, is ſhorter than the ſolar by about eleven days, which at the end of three years make a month, they then intercalate a thirteenth month, which they call *Veadar*, or the ſecond Adar.

ADARCE, among the ancients, was a kind of ſaltiſh concretion, found on reeds, graſs, &c. in the marſhes of Galatia. Its ſubſtance is lax and porous, like that of the baſtard ſpunge, and is conſidered as a deterſive, and proper for diſſipating tetters, freckles, and other cutaneous blemiſhes.

ADARCON, a Jewiſh gold coin, worth about fifteen ſhillings ſterling.

ADARME, in commerce, a ſmall Spaniſh weight, uſed at Buenos Ayres, and other parts of South America, nearly equal to our dram.

ADARTICULATION, a term uſed by ſome anatomiſts to ſignify that ſpecies of articulation generally called arthrodia. See Arthrodia.

ADATIS, in commerce, a name given to the muſlins brought from the Eaſt Indies. The fineſt are thoſe of Bengal, and run about three quarters wide.

ADDER, the vulgar name for the viper. See VIPER.

ADDER-STUNG. Cattle are ſaid to be adder-ſtung when their udders are bit by the adder, or the hedge-hog. The general method of curing this is by an ointment compoſed of dragon's blood, barley-meal, and the white of eggs.

ADDER'S-TONGUE, in botany, the Engliſh name of the ophiogloſſum. See OPHIOGLOSSUM.

ADDICE, or ADZE, a kind of crooked ax, much uſed by ſhipwrights, coopers, &c.

ADDICTION, in the Roman law; a transferring, or making over, goods, &c. to another, either by ſale, or the ſentence of a court of judicature.

The word is formed from *addico*, one of the words uſed by the Roman judges when they allowed the delivery of the thing or perſon on whom judgment had paſſed. Hence the goods, thus adjudged by the prætor, were called *bona addicta*, and the debtors delivered up in the ſame manner to their creditors, *ſervi addicti*.

ADDITAMENT, ſomething added to another. Thus phyſicians call the ingredients added to a medicine already compounded, additaments.

ADDITION, in a general ſenſe, implies the uniting ſeveral things together, or adding one thing to another.

ADDITION, in arithmetic, the firſt of the four fundamental rules or operations of that ſcience, and conſiſts in finding a certain number equal to two or more numbers taken together, or in finding the moſt ſimple expreſſion of a number according to the eſtabliſhed notation; the number ſo found being called their ſum.

The algebraic ſign or character of addition is +, commonly pronounced *plus*. Thus 4 + 5 ſignifies the ſum or aggregate of 4 and 5, in reading which we ſay, four *plus* five.

The addition of ſingle numbers, or thoſe conſiſting of one digit only, is very eaſy. For example, it is evident that 5 and 8, or 5 + 8, make 13.

In compound numbers, addition is performed by writing down the given numbers in vertical columns, placing units under units, tens under tens, hundreds under hundreds, &c. and then taking ſeparately the ſum of all the columns. This will be rendered very plain by an example. Suppoſe it were required to add together the numbers 2376 and 143, ſet them down in the proper ranks under each other, in the following manner:

2376
143

2519 ſum, or total.

Begin by adding the units, ſaying, 3 and 6 make 9, which write down under the column of units; then proceeding to the column of tens, ſay 4 and 7 make 11 (tens, which are equivalent to 1 hundred and 1 tens, ſet down therefore 1 ten under the column of tens, and keep 1 hundred in your memory to be carried to the column of hundreds; where ſay 1 (hundred) and 1 make 2, and 3 make 5 (hundreds), which therefore write under the column of hundreds; laſtly, proceeding to the column of thouſands, where there is but one digit or figure, write it under that column, and the ſum or total of theſe numbers collected, will be 2519, as above.

So that, to perform this operation, all the units of the firſt column muſt be collected or added; and if the ſum of the units does not exceed 9, ſuch ſum muſt be written under the column of units; but if it be greater than 9, the number of tens muſt be kept in memory to be carried to the next column of tens; and, in caſe there be any units over and above the tens, they muſt be ſet under the column of units; but if there be no overplus, then 0 muſt be put there to ſignify that there are no units, and the tens only are to be carried to the next column of tens, where the ſame method is to be ſtrictly obſerved as in the foregoing; becauſe 10 units make 1 ten, 10 tens 1 hundred, 10 hundreds 1 thouſand, &c.

Thus to add together the numbers 76948 + 24630 + 1462 + 536; place them as in the former example:

76948
24630
1462
536

103576 ſum.

And, having drawn a line under them, ſay 6 and 2 make 8, and 8 make 16; where there are 1 ten and 6 units; write therefore 6 under the column of units, and keep in mind 1 (ten) to be carried to the column of tens, where ſay 1 (ten) and 3 make 4, and 6 make 10, and 3 make 13, and 4 make 17 (tens), equal to 1 hundred and 7 tens; wherefore, under the column of tens, write 7, and carry 1 hundred to the column of hundreds, where the operation is to be purſued, ſaying 1 (hundred carried) and 5 make 6, and 4 make 10, and 6 make 16, and 9 make 25 (hundreds), equal to 2 thouſands and 5 hundreds; wherefore place 5 under the column of hundreds, and carry 2 (thouſands) to that of thouſands, where ſay 2 (thouſands) and 1 make 3, and 4 make 7, and 6 make 13, equal to 13 thouſand; write therefore 3 under the column of thouſands, and carry 1 to the column of tens of thouſands, where ſay 1 (ten thouſand) and 2 make 3, and 7 make 10 (tens of thouſands, equal to 1 hundred thouſand); you muſt therefore write 0 under the column of tens of thouſands, to ſignify that there are none of that denomination, and place before it 1. which finiſhes the operation, and makes the ſum total 103576.

ADDITION *of different Denominations.* When the numbers are of different denominations, or when they contain, for example, pounds, ſhillings, and pence; or, yards, feet, and inches, &c. care muſt be taken to place pence under pence, ſhillings under ſhillings, pounds under pounds, &c. and work as before. Suppoſe, for inſtance, the following numbers were to be added, 240*l.* 14*s.* 6*d.* + 86*l.* 10*s.* 4*d.* + 4*l.* 9*s.* 3*d.* diſpoſe them in the following manner:

£.	*s.*	*d.*
240	14	6
86	10	4
4	9	3
331	14	1 ſum.

And, having drawn a line under, begin with the pence, ſaying 3 and 4 make 7, and 6 make 13 pence, equal to 1 ſhilling and 1 penny; write therefore 1 penny under the column of pence, and carry 1 ſhilling to the column of ſhillings, and ſay 1 and 9 make 10, and 4 make 14 ſhillings, equal to 4 ſhillings, and 1 to be carried to the tens of ſhillings, where ſay 1 and 1 make 2, and 1 make 3 (tens of ſhillings), which exceeding 1 pound by 1 ten ſhillings, ſet down 1 in the column of tens of ſhillings, and carry the ſuperfluous 2 tens of ſhillings, equal to 1 pound, to the column of units of pounds, and then add up the ſeveral numbers of pounds as has been before directed, and the ſum total will be found to be 331*l.* 14*s.* 1*d.*

ADDITION *of Decimals* is performed in the ſame manner as that of whole numbers, as may be ſeen in the following example:

475,673
126,73
32,067
1,333

635,803

See the article DECIMAL.

In the addition of vulgar fractions, when two or more fractions are to be added into one ſum, reduce all the given fractions to ſimple fractions of one unit and one denominator, if they are not ſo already; then the ſum of the numerators being made a numerator to the common denominator, make the fractional ſum ſought; which may be farther reduced as the caſe admits. See FRACTIONS.

Addition *of Algebra*, or the addition of indeterminate quantities, deſigned by letters of the alphabet, is performed by joining the quantities with their proper ſigns, and reducing thoſe which are capable of reduction, that is, ſimilar magnitudes. See Similar and Algebra.

Thus a, added to the quantity b, makes $a+b$, and a joined with $-b$, makes $a-b$, $-a$ and $-b$, makes $-a-b$, $7a$ and $9a$ makes $7a+9a=16a$; for $7a$ and $9a$ are ſimilar magnitudes.

When algebraical magnitudes, required to be added together, are compounded of ſeveral terms, of which ſome are ſimilar; for inſtance, if the polynomial $3a^2b^3-5cs^4-4dr+2s$, were to be added to the polynomial $-s+4cs^4-a^2b^3+4dr$, write down firſt one of theſe polynomials, juſt as it is given.

$$\begin{array}{rrrrl} 3a^2b^3 & -5cs^4 & -4dr & +2s & \\ -a^2b^3 & +4cs^4 & +4dr & -s & \\ \hline a^2b^3 & -cs^4 & * & +s & \text{ſum.} \end{array}$$

Then diſpoſe the other polynomial under it in ſuch a manner that the ſimilar terms may fall directly under one another; draw a line under both thus diſpoſed, and, reducing ſucceſſively the ſimilar terms to their moſt ſimple expreſſion, the ſums of the two polynomials will be found to be $2a^2b^3-cs^4+s$, placing an aſteriſk or 0 under ſuch terms as totally deſtroy each other.

Note, ſuch quantities are called ſimilar, in algebra, as have the ſame letters, and preciſely the ſame number of letters; ſo $5abd$ and $2abd$ are ſimilar magnitudes, the former ſignifying that the magnitude abd is taken 5 times, and the ſecond that it is taken 2 times, in the whole; therefore, it is taken 7 times, and therefore ſhould be written $7abd$, inſtead of $5abd+2abd$; and as the expreſſion $7abd$ is more ſimple than $5abd+2abd$, it is ſaid in this caſe to be reduced to the moſt ſimple expreſſion.

In order to diſcern ſimilar algebraic magnitudes readily, there is no need of giving attention to their coefficient; but the letters ſhould be written in alphabetical order. Notwithſtanding $2bad$, be the ſame thing as $2abd$ or $2dba$, yet care ſhould be taken not to invert the order of the alphabet; we ſhould not write $2abd$ inſtead of $2bad$, or of $2bda$. This ſerves to make the computation the clearer, $5abd$ and $2abd$ appear more like ſimilar magnitudes than $5bad$ and $2bda$, which yet are the ſame as the former. The quantities $3b^2c$ and $4b^2c$, are likewiſe ſimilar magnitudes: but the magnitudes $4a^3f$ and $2a^3$ are not ſimilar, though they have the common quantity a^3, it being eſſential to ſimilar magnitudes, to have the ſame letters and the ſame number of letters.

Obſerve farther, that poſitive quantities, or thoſe affected with the ſigns +, are directly oppoſite to negative quantities, or thoſe preceded by the ſign of —: thus when the quantities propoſed to be added are ſimilar and affected with contrary ſigns, they wholly or partly deſtroy one another, that is, in caſe one be greater than the other, there is deſtroyed in the greateſt a part equal to the leaſt, and what remains is the difference between the greateſt and the leaſt, affected with the ſign of the greateſt.

Now as this operation, or reduction, falls always upon the coefficients: it is manifeſt that $5df$ and $-3df$, are reducible to $+2df$, ſince $+5df$ ſhews that the quantity df is taken 5 times, and $-3df$ alſo ſhews that the ſame quantity df is 3 times retracted: but the ſame quantity taken 5 times, and ſubducted 3 times, is the ſame as if taken but twice.

In like manner $+5fm$ and $-6fm$, will be reduced to $1fm$, or ſimply to fm; for $-6fm$ is the quantity fm 6 times ſubducted, and $+5fm$ is the ſame quantity taken 3 times, the remaining quantity fm muſt therefore be negative, and conſequently muſt be $-fm$. See Negative.

There are no algebraic quantities incapable of addition, under the above rules; thus $\frac{3a}{c}+\frac{5a}{c}=\frac{8a}{c}$, $2\sqrt{ac}+7\sqrt{ac}=9\sqrt{ac}$, $6\sqrt{ab-xx}+7\sqrt{ab-xx}=13\sqrt{ab-xx}$. Alſo $6\sqrt{3}+7\sqrt{3}=13\sqrt{3}$. And farther, $a\sqrt{ac}+b\sqrt{ac}=(a+b)\sqrt{ac}$, by adding together the magnitudes a, b, which multiply the quantity $\sqrt{ac}$.

In like manner $\frac{2a+3c\sqrt{3axx-x^3}}{a+x}+\frac{3a\sqrt{3axx-x^3}}{a+x}=\frac{\overline{5a+3c}\times\sqrt{3axx-x^3}}{a+x}$, as $2a+3c+3a=5a+3c$.

Poſitive or affirmative fractions, having the ſame denominator, are added, by adding together their numerators, and placing the common denominator under the ſum: thus $\frac{2ax}{b}+\frac{3ax}{b}=\frac{5ax}{b}$; $\frac{8a\sqrt{cx}}{2a+\sqrt{cx}}+\frac{17a\sqrt{cx}}{2a+\sqrt{cx}}=\frac{25a\sqrt{cx}}{2a+\sqrt{cx}}$; and $\frac{2a}{c}+\frac{bx}{c}=\frac{2a+bx}{c}$. See Fraction.

Negative quantities are added exactly in the ſame manner as affirmative ones: ſo $-\frac{4ax}{b}$ and $-\frac{11ax}{b}=-\frac{15ax}{b}$; $-a\sqrt{ax}$ and $-b\sqrt{ax}=\overline{-a-b}\times\sqrt{ax}$.

When a negative quantity is to be added to an affirmative one, the affirmative muſt be diminiſhed by the negative, or the negative by the affirmative: ſo $+3-2=1$, $\frac{11ax}{b}$ and $-\frac{4ax}{b}=\frac{7ax}{b}$: likewiſe $+2\sqrt{ac}$ and $-7\sqrt{ac}=-5\sqrt{ac}$.

Addition *of Irrationals*, or *Surds*. In theſe operations it muſt be obſerved, that if the ſurds are not of the ſame denomination, they muſt be made to be ſo: in which caſe, if they are commenſurable to each other, add the rational quantities without connecting them by any ſign; and to the ſum put the radical ſign. Thus $\sqrt{8}+\sqrt{18}=\sqrt{4\times 2}+\sqrt{9\times 2}=2\sqrt{2}+3\sqrt{2}=5\sqrt{2}=\sqrt{50}$. On the contrary, $\sqrt{5}$ and $\sqrt{7}$ being incommenſurables, their ſum will be $\sqrt{7}+\sqrt{5}$. See Incommensurable and Surd.

Addition *of Logarithms*. See Logarithms.

Addition *of Ratios*, is the ſame with compoſition of ratios. See Ratio.

Additions, among diſtillers, ſignify all ſuch things as are added to the waſh or liquor, while fermenting to increaſe the quantity and vinoſity of the ſpirit, or to give it a particular flavour. See Distillation.

Additions, in law, denote the titles given to a man beſides his chriſtian and ſurname, implying his eſtate, degree, myſtery, trade, place of abode, &c.

Theſe additions were ordained to prevent one man's being moleſted inſtead of another, and that each individual might be certainly known, and bear his own burden.

Additions, in heraldry, ſignify ſome things added to a coat of arms as marks of honour, and therefore directly oppoſite to abatements.

ADDITIONAL, in a general ſenſe, implies ſomething added to the uſual ſum or quantity.

Additional *Duties*, in commerce, ſignify thoſe duties which are charged upon certain commodities, over and above what they uſed to pay formerly.

ADDITIVE, ſomething to be added. Thus we ſay additive quantities, ratios, equations, &c.

ADDRESS, in a general ſenſe, implies the conducting any affair with ſkill and propriety.

Address, in a particular acceptation, ſignifies a congratulation, petition, requeſt, or remonſtrance, preſented to the king in the name of ſome conſiderable body of men.

Address, in commerce, is the direction wrote on the back of a letter or packet, ſent by the poſt or ſome meſſenger.

The addreſs ſhould contain the name, quality, and place of abode, of the perſon to whom the letter or packet is to be delivered, together with the province, county, city, town, or place, where the party reſides.

ADDUCTION, in anatomy, the action of the adductors, or adducent muſcles.

ADDUCTORS, or **Adducent** *Muſcles*, in anatomy, a general name for ſuch muſcles as ſerve to draw one part of the body towards another; and conſequently are antagoniſts to the abductors.

The word is formed from the Latin, *ad*, to, and *duco*, to lead, or draw.

Adductor *Indicis*, is a muſcle of the index, or fore-finger, ariſing from the internal part of the firſt bone of the thumb, and terminating in the firſt bone of the fore-finger, which it draws towards the thumb.

Adductor *Oculi*, is a muſcle of the eye, which, by its action, draws the pupil towards the noſe. It is alſo called Bibitorius, becauſe it directs the eye towards the cup in drinking.

Adductor *Pollicis*, is a muſcle of the thumb which riſes tendinous in common with the adductor indicis, and aſcends obliquely towards a broad termination at the ſuperior part of the firſt bone of the thumb: its uſe is to bring the thumb near the fore-finger.

Adductor *Pollicis Pedis*, is a muſcle of the great toe. It ariſes from the inferior part of the os cuneiforme tertium, and is inſerted into the internal part of the oſſa ſeſſamoideia of the great toe, which it draws nearer the reſt.

ADELLA, or Adena, the Italian name of a fiſh, thought to be peculiar to the river Po, in Italy. It ſometimes increaſes to the weight of one thouſand pounds, and is taken with a monſtrous large hook faſtened to the end of a chain; and they are obliged to draw it out of the water with a yoke of oxen. It differs from a ſturgeon, both in being a river fiſh, and in its bulk. When it arrives at a certain ſize, it loſes the barbs it had before, like thoſe of a ſturgeon. The fleſh of a ſturgeon is firm, and of a pleaſant taſte; but that of this fiſh is ſoft, and not ſo agreeable. The mouth is like that of a ſturgeon, but much larger, and divided a little obliquely; beſides, it is not ſo pointed as in a ſturgeon; add to this, that the colour of the back is whitiſh, and has a wooly appearance. *Brookes's Natural Hiſt.*

ADELPHIANI, in eccleſiaſtical hiſtory, a ſect of heretics, who always faſted on Sundays.

ADEMPTION, in the civil law, implies the revocation of a grant, donation, or the like.

ADENANTHERA, in botany, a genus of plants, whoſe flower is of a campanulated form, and conſiſts of five leaves. It is one of the decandria-claſs of Linnæus, with a long compreſſed pod, containing ſeveral round ſeeds.

ADENOGRAPHY, a deſcription of the glands.

The word is Greek, *αδηνογραφια*, compounded of *αδην*, a gland, and *γραφω* to deſcribe.

We have a treatiſe wrote by Wharton, entitled Adenography, printed in twelves, at London, in the year 1656; and another work under the ſame title, wrote by Nuck, and printed in octavo, at Leyden, in 1691; a ſecond edition of it was publiſhed in 1722.

ADENOIDES, glandulous, or of a glandular form; an epithet applied to the proſtatæ. See Prostatæ.

The word is Greek, and compounded of *αδην*, a gland, and *ειδος*, reſemblance.

ADENOSUS *Abſceſſus*, in ſurgery, a hard crude tumour, reſembling a gland, and very difficult to be reſolved.

ADEONA, in mythology, the name of a goddeſs invoked by the Romans when they ſet out upon a journey.

ADEPHAGIA, in mythology, the goddeſs of gluttony, to whom the Sicilians paid a religious worſhip.

ADEPS, in anatomy, ſignifies properly the hard fat, or ſuet, found in the abdomen, and diſtinguiſhed from pinguedo; but moſt writers uſe the two terms indifferently.

ADEPTS, a name given to thoſe alchymiſts who pretend to have diſcovered the philoſophers ſtone, and the univerſal remedy.

The word is formed from the Latin *adipiſcor*, to obtain; becauſe, according to Paracelſus, both the one and the other of the above ſecrets muſt be obtained from heaven.

ADEQUATE, in a general ſenſe, implies ſomething exactly correſponding to, or expreſſive of, another.

Adequate *Ideas*, are thoſe ideas which perfectly repreſent all the parts or properties of another. See Idea.

ADER, in natural hiſtory, the name of a very curious ſhell, of a fine ſky-blue colour, with yellow rays one over another towards the bottom. It is very ſmall, being never above a quarter of an inch in length, and three twelfths of an inch broad. It is pointed at the top, and has ſlight folds near the hinge, where there is alſo a ſmall cavity. Each valve has about fifty deep furrows running longitudinally from the top to the oppoſite extremity. The edges are all round decorated with ſmall teeth, equal in number with the furrows. When the cruſt is taken off, it appears to be of a ſhining violet colour. The ſhell on the inſide is generally white, though ſometimes of a dark violet. *Brookes's Natural Hiſt.*

ADESSENARIANS, in eccleſiaſtical hiſtory, a ſect of Chriſtians who maintained the real preſence in the euchariſt; but in a ſenſe different from what the Roman church calls tranſubſtantiation. Nor were the Adeſſenarians agreed among themſelves with regard to the mode in which the real preſence exiſted: ſome being perſuaded that the body of Chriſt is in the bread; others that it is about the bread; ſome that it is with the bread; and others that it is under the bread.

ADFECTED *Equations*, in algebra, is an equation wherein the unknown quantity is found in two or more different powers. Thus $x^3 - px^2 + 9x - r = 0$; and $x^4 + x^3 - 19x^2 - 49x - 30 = 0$, are adfected equations. See Equation.

ADFILIATION, a cuſtom uſed among the ancient Goths, and other northern nations, whereby the children of a former marriage were put upon the ſame footing with thoſe of the ſecond. This cuſtom is ſtill retained in ſome parts of Germany, under the title of *einkindſchafft*.

ADHATIDA, in botany, a genus of plants, whoſe flower conſiſts of a ſingle leaf divided into two lips, of which the upper is bent backwards, and the lower again divided into three ſegments. The piſtil, which is fixed into the lower part of the flower, in the manner of a nail, becomes a fruit, or capſule, flat and divided into two cells, containing ſeveral ſmall compreſſed ſeeds.

ADHESION, in a general ſenſe, implies the ſticking or adhering of two bodies together, either by their own proper action, or by the compreſſion of ſome external fluid.

The word is Latin, *adhæſio*, and compounded of *ad*, to, and *hæro*, to cleave.

Anatomiſts often find in diſſections, adheſions of the lungs to the ſides of the thorax, pleura, or diaphragm; or of the heart to its pericardium, &c.

Adhesion, in philoſophy. See the article Attraction *of Coheſion*.

Adhesion, among logicians, implies the maintaining ſome tenet, merely on account of its ſuppoſed advantage, without conſidering whether it be ſupported by any poſitive evidence.

ADJACENT, an epithet applied to ſuch things as adjoin to or are ſituated near each other.

The word is formed from the Latin, and compounded of *ad*, to, and *jacio*, to caſt.

ADIANTHUM, maidenhair, in the materia medica, is an evergreen plant, with ſlender, ſmooth, ſhining, blackiſh ſtalks; producing no manifeſt flower. The ſeeds are a fine duſt, lying in roundiſh ſpecks about the edges of the backs of the leaves, which curl over and cover them. There are two ſpecies of this plant diſtinguiſhed by botaniſts in the following manner:

Adianthum *Verum*, or *Capillus Veneris*, true maidenhair. This plant is about half a foot high, with ſeveral pinnæ of little roundiſh ſinuated or nearly triangular leaves towards the tops of the ſtalks.

Adianthum *Canadenſe*, Canada maidenhair; larger, with ſpreading branches.

The firſt ſort grows wild in Italy, and the ſouthern parts of France, from whence the dry leaves are ſometimes brought to us. The ſecond, a native of America, is cultivated in ſome of our gardens.

The leaves of both the maidenhairs have a ſlight ſweetiſh, roughiſh taſte, and a pleaſant, but weak ſmell, very perceptible when boiling water is poured on them. They readily give out to the water the whole of their ſmell, taſte, and medicinal virtue: the infuſions are not ungrateful; particularly that of the Canada ſort, whoſe flavour is both pleaſanter and ſtronger than that of the other. Infuſions or decoctions of them, inſpiſſated, yield a moderately rough, bitteriſh, mucilaginous extract. Rectified ſpirit of wine extracts their taſte and flavour, and gains from them a deep green colour, but diſſolves little of the mucilaginous ſubſtance, in which a conſiderable part of their virtue conſiſts: the extract obtained by inſpiſſating the tincture, is leſs in quantity, and ſtronger in taſte, than that made with water.

Maidenhair has long been held in eſteem againſt diſorders of the breaſt; for promoting expectoration, ſoftening recent coughs, and allaying the tickling in the throat occaſioned by defluxions of the rheum. For theſe purpoſes, a ſyrup of the true ſort, flavoured with a little orange-flower water, has been uſually brought from France; and a ſyrup of the Canada ſort, made with maple ſugar, is ſometimes received from America. The virtue of the maidenhair is obtainable, however, to much better advantage, by drinking an infuſion of the herb as tea, ſweetened either with ſugar, or by the addition of a little liquorice. The Engliſh maidenhair has been commonly ſubſtituted in the pectoral ſyrups and infuſions made among us: the Canada ſpecies, which appears to be ſuperior to both, is ſaid to have been long made uſe of in France, and has lately been introduced into practice in this country. *Lewis's Hiſtory of the Materia Medica.*

ADIAPHORISTS, in eccleſiaſtical hiſtory, a name given in the ſixteenth century to the moderate Lutherans, or thoſe that embraced the opinions of Melancthon, whoſe pacific diſpoſition was far from being ſuitable to the extreme vivacity of Luther. Since the year 1548, the name Adiaphoriſts has been applied to thoſe Lutherans who ſubſcribed to the Intrem publiſhed by Charles V. at the diet of Augſburg.

The word is formed from the Greek, *αδιαφορος*, indifferent; compounded of *α*, priv. and *διαφορος*, different.

ADIAPHOROUS, an epithet given by Mr. Boyle to a ſpirit diſtilled from tartar, and ſome other vegetable ſubſtances. It is ſaid to be, in ſeveral reſpects, different from any other ſpirit, and to be neither acid nor alkaline.

ADJECTIVE, in grammar, a word which expreſſes ſome quality or other accident belonging to the ſubſtantive.

But as every quality ſuppoſes a ſubſtance, of which it is the quality; it follows, that every adjective ſuppoſes a ſubſtantive. If we ſay, the *fine* touches you; the *true* ought to be the ſubject of our enquiries; the *good* is preferable to the *handſome*, *&c.* it is evident that we conſider theſe qualities ſo far only as they are attached to ſome ſubſtance or agent: the *fine*, that is, the ſubſtance which is fine; the *true*, or that which is true, &c. In theſe examples the *fine*, the *true*, *&c.* are not merely adjectives: they are adjectives uſed ſubſtantively; they denote any agent whatſoever, provided that agent be fine, true, good, &c. It therefore follows, that theſe words are both adjectives and ſubſtantives at the ſame time; they are ſubſtantives becauſe they denote an agent; they are adjectives becauſe they aſſign a certain qualification to the agent.

There are as many ſpecies of adjectives as there are ſpecies of qualities, manners, and relations, which the human mind can conſider in the objects.

We do not know the eſſence of the ſubſtances themſelves, we know them only by the impreſſions they make upon our ſenſes; and therefore we give the objects ſuch and ſuch qualities as are proper to the ſenſe thoſe impreſſions affect: if the eyes are affected, we ſay that the object is coloured; that it is either white, black, red, blue, &c. If it affects the taſte, we denominate it either ſweet, bitter, ſour, unſavoury, &c. If it regards the ſenſe of feeling, the object is either rough, ſmooth, hard, ſoft, fat, oily, dry, &c. Conſequently the words white, black, red, blue, ſweet, bitter, ſour, unſavoury, &c. are ſo many qualifications given to objects, and therefore ſo many adjectives; and becauſe theſe impreſſions are cauſed by the action of phyſical objects upon our ſenſes, we may properly call theſe words by the name of phyſical adjectives.

At the ſame time it will be neceſſary to obſerve, that there is nothing in the object ſimilar to the ſentiment they excite in us; all we can infer from hence is, tha ſuch objects have the property of exciting in us ſuch a ſenſation, or ſuch a ſentiment, according to the diſpoſition of our organs, and the laws of univerſal mechaniſm. A needle, for inſtance, is ſuch an object, that if the point of it be forced into the ſkin, the party will feel a ſenſation of pain; but this ſenſation will be peculiar to the perſon affected, and not at all to the needle; we may ſay the ſame of every other ſenſation.

Beſides the phyſical, there are alſo metaphyſical adjectives, which are equally numerous, and from which we might form as many different claſſes as there are kinds of contemplations under which the mind may conſider phyſical and metaphyſical objects.

As we are accuſtomed to qualify phyſical beings, in conſequence of the immediate impreſſions they make upon us; ſo we alſo qualify metaphyſical and abſtract beings in conſequence of ſome conſiderations of our mental faculty, with reſpect to theſe beings. The adjectives that expreſs theſe ſpecies of contemplations are what we call metaphyſical adjectives. Perhaps the following examples will better explain what we mean by metaphyſical adjectives.

Let us ſuppoſe a row of trees in the midſt of a vaſt plain, and that two perſons are juſt entered this row, one at the one end and the other at the other; each of thoſe, obſerving the trees of this row, ſays, this is the firſt; ſo that the tree which each perſon calls the firſt, is the laſt with regard to the other. Thus firſt and laſt, together with the other nouns of ordinal number, are nothing more than metaphyſical adjectives; or, more properly, adjectives of relation and numeral affinity.

The nouns of cardinal numbers, ſuch as two, three, &c. are alſo metaphyſical adjectives, becauſe they ſerve to qualify a collection of individuals.

Great and little are alſo metaphyſical adjectives; for any object, whatſoever it be, is neither great nor little conſidered in *itſelf*; it acquires thoſe appellations only from its relation to ſome other object: that to which we have given the name of great, has cauſed in our mind a different impreſſion from what we call little; it is the perception of this difference which occaſions us to invent the names of great, little, leſs, &c.

Different, ſimilar, alike, are likewiſe metaphyſical adjectives, which qualify the ſubſtantives in conſequence of certain particular contemplations of the mind. The word different, for inſtance, qualifies a noun, when we feel it has not made impreſſions in our mind ſimilar to thoſe of another. Where two objects are ſo formed that we perceive they are diſtinct, though in ſome particulars they make ſimilar impreſſions on our mind, we ſay that they are ſimilar in theſe particulars, becauſe in that reſpect we find ourſelves affected in the ſame manner: ſimilar therefore is a metaphyſical adjective.

If we walk round a fortified city, we ſhall perceive that it is incloſed within its bulwarks; we obſerve a country bounded on the one ſide by a river, on the other by a foreſt; we ſee a picture incloſed in its frame, the extent whereof we can even meaſure, and the limits of which we plainly perceive: we place a book or a guinea upon a table, and obſerve that they occupy only a ſmall extent upon it; that the table fills but a ſmall ſpace of the chamber, and that the chamber itſelf is ſurrounded with walls; in ſhort, all bodies appear to be bounded by others, beyond which there is ſtill ſpace; theſe bodies therefore are bounded, terminated, and ended: thus bounded, terminated, and ended, are nothing more than metaphyſical adjectives; becauſe they imply only the bounds and knowledge of a further extenſion.

On the other hand, if we apply ourſelves to reckon any number whatſoever, whether it be the number of the ſands on the ſea-ſhore, or of the leaves of all the trees growing upon the face of the earth, we ſhall perceive that this number can be increaſed, till at laſt, tired with innumerable additions, which are always poſſible, we ſay, that this number is infinite, or ſuch that we cannot perceive its limits, becauſe we can always increaſe the ſum total. The ſame may be ſaid of all extended bodies, the boundaries of which our imaginations can always remove, at laſt, to infinite extenſion; the term infinite, therefore, is a metaphyſical adjective.

Perfect is again another metaphyſical adjective: cuſtom ſhews us, that there are beings that have advantages of which others are deſtitute: we find that the former are therefore in that reſpect of more value than the latter: plants, flowers, and trees, are worth more than common ſtones; animals have qualities ſtill more preferable to thoſe of plants; and man has knowledge which raiſes him above animals. If we examine attentively two pictures of the ſame perſon, one whereof recals to our mind, in a very forcible manner, the image of that perſon, while the other excites only a faint idea; we ſay, that the picture ſpeaks, or that it is perfect, at leaſt, with reſpect to the other.

AD INQUIRENDUM, in law, is a writ commanding enquiry to be made about ſomething connected with a cauſe depending in the king's courts.

ADJOURNMENT, the putting off a court, or other meeting, till another day.

The word is formed from the Latin, *ad*, to, and the French *jour*, a day, q. d. to another day.

There is a difference between the adjournment and the prorogation of the parliament; the former not only being for a ſhorter time, but alſo done by the houſe itſelf; whereas the latter is an act of royal authority.

ADIPOSE, an epithet applied by phyſicians, anatomiſts, &c. to ſeveral cells, ducts, and the like, as belonging to the fat of bodies.

The word is Latin, *adipoſa*; and derived from *adeps*, fat.

Adipose *Membrane*, *Adipoſa Membrana*, in anatomy, is a particular membrane, inveſting the human body immediately under the ſkin, and ſuppoſed to be the baſis of the fat which is depoſited in its cells.

This is not however a ſingle membrane, but a congeries of a great number of membranous laminæ, joined irregularly to each other at different diſtances, ſo as to form numerous interſtices of different capacities communicating with one another.

ADIT *of a Mine*, the paſſage, or opening, through which the miners paſs into the mine.

The word is Latin, *aditus*, and ſignifies a way or paſſage.

AJUDICATION, in law, implies the act of adjudging, or determining, a cauſe in favour of ſome perſon.

The word is Latin, *adjudicatio*, and compounded of *ad*, to, and *judico*, to give ſentence.

ADJUNCT, among philoſophers, ſignifies ſomething added to another, without being any neceſſary part of it. Thus water abſorbed by cloth or a ſpunge, is an adjunct, but no neceſſary part of either of theſe ſubſtances.

The word is Latin, *adjunctum*, and compounded of *ad*, to, and *jungo*, to join.

Adjunct, in metaphyſics, ſome quality belonging to either the body or mind, whether natural or acquired. Thus thinking is an adjunct of the mind, and growth an adjunct of the body.

Adjunct, in rhetoric and grammar, implies an epithet, or adjective, added for enlarging and augmenting the energy of a diſcourſe.

Adjunct is alſo uſed to ſignify a collegue, or ſome perſon aſſociated with another, as an aſſiſtant.

AD JURIS REGIS, in law, is a writ which lies for a clerk preſented to a living by the king.

ADJUTAGE, in hydraulics, is a tube fitted to the mouth of a jet d'eau. See the article Ajutage.

ADJUTANT, in military affairs, an officer whoſe buſineſs it is to aſſiſt the major, and thence often called the aid-major.

The word is derived from the Latin *adjuvo*, to aſſiſt.

ADJUTORIUM, among phyſicians, implies ſome medicine, generally a topical or external application, preſcribed as an aſſiſtant to another of more efficacy.

Adjutorium, in anatomy, is a name given to a bone of the arm, generally called the humerus. See the article Humerus.

ADMEASUREMENT, in law, is a writ for the adjuſting the ſharers of ſomething to be divided.

The word is formed from the Latin *admenſuratio*, compounded of *ad*, and *metior*, to meaſure.

ADMINICLE, a term uſed, in our old law books, to imply any aid, help, aſſiſtance, or ſupport.

The word Latin, *adminiculum*, and derived from *adminiculor*, to prop, or ſupport.

Antiquarians call the attributes of Juno, repreſented on medals, by the name of adminicles.

ADMINISTRATION, in a general ſenſe, implies the direction of government, or direction of affairs

The word is Latin, *adminiſtratio*, and derived from *adminiſtro*, to manage or govern.

Administration, in law, ſignifies the office of an adminiſtrator.

ADMINISTRATOR, in law, ſignifies the perſon to whom the goods, effects, or eſtate, of one who died inteſtate, are intruſted, and for which he is accountable when required.

The biſhop of the dioceſe, where the party dies, is regularly to grant adminiſtration; but if the inteſtate has goods in ſeveral dioceſes, adminiſtration muſt be granted by the archbiſhop in the prerogative court.

ADMINISTRATRIX, a woman who acts as adminiſtrator.

ADMIRAL, a great officer, or magiſtrate, who has the government of a navy, and the hearing of all maritime cauſes.

Authors are divided with regard to the origin and denomination of this important officer, whom we find eſtabliſhed in moſt kingdoms that border on the ſea. Some borrow it from the Greeks, the captain of the ſeas, under the emperors of Conſtantinople, being called αμηραλιος, *admiralius*, a Greek term, compounded of αλμυρος, ſalina, or αλμη, ſalt water, and αρχος, *princeps*; in regard his juriſdiction lay on the ſea, which the Latins call *ſalum*: but it is to be obſerved, that this officer had not the ſupreme adminiſtration of naval affairs; that immediately belonged to the dux magnus, or grand general, to whom the admirals were ſubordinate, in quality of Portocomes, firſt count or aſſociate. Others are of opinion, that this word is derived from the Arabic, Emir ol, i. e. great or high lord, and the Greek αλιος, marine; and accordingly we frequently find Emir, in Zonaras, Cedrenus, Nicetas, and other Greeks of that time, uſed in the ſenſe of a commander.

But Sir Henry Spelman, with more reaſon, thinks it paſt doubt that both the name and dignity were derived from the Saracens, and, by reaſon of the holy wars, brought amongſt us; for admiral, in the Arabian language, ſignifies a prince, or chief ruler, and was the ordinary title of the governors of cities, provinces, &c. and that therefore they called the commander of the navy by that name, as a name of dignity and honour. And, indeed, there are no inſtances of admirals in this part of Europe, before the year 1284. when Philip of France, who had attended St. Lewis in the wars againſt the Saracens, created an admiral.

Du Cange aſſures us, that the Sicilians were the firſt, and the Genoeſe the next, who gave the denomination of admiral to the commanders of their naval armaments, and that they took it from the Saracen or Arabic Emir, a general name for every commanding officer. As for the exact time when the word was introduced among us, it is uncertain; ſome think it was in the reign of Edward I. Sir Henry Spelman is of opinion that it was firſt uſed in the reign of Henry III. becauſe neither the laws of Oleron, made in 1266, nor Bracton, who wrote about that time, make any mention of it; and that the term admiral was not uſed in a charter in the eighth of Henry III. wherein he granted this office to Richard de Lacey, by theſe words, *Maritimam Angliæ*; but in the fifty-ſixth year of the ſame reign, not only the hiſtorians, but the charters themſelves, very frequently uſe the word admiral.

Anciently there were generally three or four admirals appointed in the Engliſh ſeas, all of them holding the office *durante bene placito*; and each of them having particular limits under their charge and government;

as admirals of the fleet of ſhips, from the mouth of the Thames, northward, ſouthward, or weſtward.

Beſides theſe, there were admirals of the Cinque ports, as in the reign of Edward III. when one William Latimer was ſtiled, *admiralis quinque portuum*; and we ſometimes find that one perſon has been admiral of the fleets to the ſouthward, northward, and weſtward: but the title of *admiralis Angliæ* was not frequent till the reign of Henry IV. when the king's brother had that title given him, which in all commiſſions afterwards was granted to the ſucceeding admirals. It may be obſerved, that there was a title above that of admiral of England, which was, *locum tenens regis ſuper mare*, the king's lieutenant-general of the ſea; this title we find mentioned in the reign of Richard II.

Before the uſe of the word admiral was known, the title of *cuſtodes maris* was made uſe of.

Lord high ADMIRAL *of England*, in ſome ancient records called *capitanus maritimarum*, an officer of great antiquity and truſt, as appears by the laws of Oleron, ſo denominated from the place they were made at by Richard I. The firſt title of admiral of England, expreſsly conferred upon a ſubject, was given by patent of Richard II. to Richard Fitz-allen, jun. earl of Arundel and Surry: for thoſe who before enjoyed this office were ſimply termed admirals, though their juriſdiction ſeems as large, eſpecially in the reign of Edward III. when the court of admiralty was firſt erected.

This great officer has the management of all maritime affairs, and the government of the royal navy, with power of deciſion in all maritime caſes, both civil and criminal: he judges of all things done upon, or beyond the ſea, in any part of the word; upon the ſea-coaſts, in all ports and havens, and upon all rivers below the firſt bridge from the ſea. By him, vice-admirals, rear-admirals, and all ſea-captains are commiſſioned; all deputies for particular coaſts, and coroners to view dead bodies found on the ſea-coaſts, or at ſea: he alſo appoints the judges for his court of admiralty, and may impriſon, releaſe, &c. All ports and havens are *infra corpus comitatus*, and the admiral hath no juriſdiction of any thing done in them. Between high and low water-mark, the common law and the high-admiral have juriſdiction by turns, one upon the water, and the other upon the land. The admiral hath power to arreſt ſhips in great ſtreams, and during the ſame voyages, every commanding officer and ſoldier of ſhips of war, ſhall obſerve the commands of the admiral, &c. on pain of death, or other puniſhment.

The lord-admiral hath power, not only over the ſeamen ſerving in his ſhips of war, but over all other ſeamen, to arreſt them for the ſervice of the ſtate; and, if any of them run away, without leave of the admiral, he hath power to make a record thereof, and certify the ſame to the ſheriffs, mayors, bailiffs, &c. who ſhall cauſe them to be apprehended and impriſoned.

To the lord high-admiral belong all penalties and amercements of all tranſgreſſions at ſea, on the ſea-ſhore, in ports and havens, and all rivers below the firſt bridge from the ſea; the goods of pirates and felons condemned or enſlaved, ſea wrecks, goods floating on the ſea, or caſt on the ſhore, (not granted to lords of manors adjoining to the ſea), and a ſhare of lawful prizes; alſo all great fiſhes, commonly called royal fiſhes, except whales and ſturgeons: to which add a ſalary of 7000l. a year.

It appears that anciently the admirals of England had juriſdiction of all cauſes of merchants and mariners, happening not only upon the main ſea, but in all foreign parts, within the king's dominions, and without them; and were to judge them in a ſummary way, according to the laws of Oleron, and other ſea laws. In the time of Edward I. and king John, all cauſes of merchants and mariners, and things ariſing upon the main ſea, were tried before the lord admiral; by all which, and divers other laws, not only the power of the admiral is declared, but the original from whence it is derived, namely, from the legiſlative power of the parliament, and not from the ſingle perſon of the king, or any other council whatever.

In ſhort, this is ſo great an office, in point of truſt, honour, and profit, that it has uſually been given to princes of the blood, or the moſt eminent perſons among the nobility. We have had no high-admiral for ſome years, the office being put in commiſſion, or under the adminiſtration of the lords commiſſioners of the admiralty, who by ſtatute have the ſame power and authority as the lord high-admiral.

ADMIRAL alſo implies the commander in chief of any ſingle fleet, or ſquadron, or, in general, any flag officer whatever. The commander of a fleet carries his flag at the main-top-maſt head.

Vice ADMIRAL is the commander of the ſecond ſquadron, and carries his flag at the fore-top-maſt head.

Rear ADMIRAL is the commander of the third ſquadron, and carries his flag at the mizzen-top-maſt head.

Vice ADMIRAL is alſo an officer appointed by the lords commiſſioners of the admiralty. There are ſeveral of theſe officers eſtabliſhed in different parts of Great Britain, with judges and marſhals under them, for executing juriſdiction within their reſpective limits. Their decrees however are not final, an appeal lying to the court of admiralty in London.

ADMIRAL is alſo an appellation given to the moſt conſiderable ſhip of a fleet of merchantmen, particularly the veſſels employed in the cod-fiſhery of Newfoundland.

ADMIRAL, in natural hiſtory, is the name of a beautiful ſhell of the voluta kind, greatly admired by the curious.

There are four ſpecies of this ſhell diſtinguiſhed by the names of grand-admiral, vice-admiral, orange-admiral, and extra-admiral. The firſt is extremely beautiful, of an elegant white enamel, variegated with bands of yellow, which, in ſome meaſure, repreſent the colours of the flags in ſhips of war. It is of a very curious ſhape, and finely turned about the head; but its diſtinguiſhing character is a denticulated line running along the center of the large yellow band; and this diſtinguiſhes it from the vice-admiral, though the head of the latter is alſo leſs elegantly formed. See plate I. *fig.* 12. where A is the admiral, and B the vice-admiral.

The orange-admiral has more yellow than any of the others, and the bands of the extra-admiral run into one another.

ADMIRALTY properly ſignifies the office of lord high-admiral, whether diſcharged by one ſingle perſon, or by joint commiſſioners, called lords of the admiralty.

Court of ADMIRALTY is a ſovereign court, held by the lord high-admiral, or lords of the admiralty, where cognizance is taken in all maritime affairs, whether civil or criminal.

All crimes committed on the high-ſeas, or on great rivers below the firſt bridge next the ſea, are cognizable in this court only, and before which they muſt be tried by judge and jury. But in civil caſes the mode is different, the deciſions being all made according to the civil law.

ADMIRATION, in grammar, a mark or character importing ſomething wonderful, or worthy of admiration. It is marked thus (!).

The word is Latin, *admiratio*, and compounded of *ad*, to, and *miror*, to wonder.

ADMISSION, among eccleſiaſtical writers, implies the act of a biſhop's admitting, or allowing, a clerk to be able, or properly qualified, for ſerving a cure.

The word is Latin, *admiſſio*, and compounded of *ad*, to, and *mitto*, to ſend.

ADMONITION, in eccleſiaſtical hiſtory, ſignified a part of diſcipline, conſiſting chiefly in warning an offender of the irregularities obſervable in his conduct, and adviſing him to be more careful for the future.

The word is Latin, *admonitio*, and compounded of *ad*, and *monito*, to admoniſh.

ADNATA, in natural hiſtory, is a general name for whatever things grow on animal or vegetable bodies, whether they are inſeparable, as hair, horns, &c. or only aſcititious, as the various epiſitical plants.

The word is Latin, and compounded of *ad*, and *nato*, to ſwim, or float with.

ADNATA *Tunica*, in anatomy, one of the tunics or coats of the eye, otherwiſe called conjunctiva and albuginea.

It is the ſame part with that termed the white of the eye, and formed by the tendinous expanſions of the muſcles which move that organ. See the article EYE.

ADNATA, or ADNASCENTA, among gardeners, ſignify thoſe off-ſets, which proceed, by a new germination under the earth, from the lilly, narciſſus, hyacinth, and other flowers, and afterwards grow to the roots.

ADNOUN, a term uſed by ſome grammarians to denote the adjective. See the article ADJECTIVE.

The word is formed from the Latin, *adnomen*, and compounded of *ad*, to, and *nomen*, a noun or name.

AD OCTO, a phraſe uſed, by ancient philoſophers, to imply the higheſt degree of perfection, the eighth being conſidered as the ſummit, or apex.

ADOLESCENCE, the flower of youth, or that part of human life intercepted between infancy and manhood.

The word is Latin, *adoleſcentia*, and derived from *adoleſco*, to grow or increaſe.

ADONAI, one of the names of God, uſed by the ſacred writers.

The word is in the plural number, and properly ſignifies *my lords*

ADONAIS, a name given by the ancient botaniſts to the anemony, from an idle ſuppoſition of its having owed its origin to the tears ſhed by Venus, in lamenting the death of her favourite Adonis. See ANEMONY.

ADONIA, in antiquity, were feſtivals celebrated in honour of Venus, and in memory of the beloved Adonis. See ADONIS.

ADONIC, a ſort of verſe uſed by the Greek and Latin poets, conſiſting of two feet, the firſt of which is a dactyl, and the ſecond a ſpondee, or trochee.

It was originally uſed in the lamentations for the death of Adonis, and from that circumſtance acquired its name. Its principal uſe among the poets, however, is only as a concluſion to the Sapphic verſe; as in the following:

Scandit æratas vitioſa naves
Cura, nec turmas equitum relinquit
Ocyor cervis & agente nimbos
Ocyor euro. HORAT.

ADONIS, in mythology, a pagan divinity, worſhipped in ſeveral places, particularly at Athens, where there were feſtivals inſtituted to him, called Adonia, and at Alexandria, where his image was carried about the city with great ſolemnity. He was a beautiful young ſhepherd, and ſon of Cynaras, king of Cyprus, by his own daughter Myrrha. The goddeſs Venus fell in love with this youth, and often came down to meet him on mount Libanus, where he was at laſt ſlain in the chace of a wild bear.

ADONIS, in zoology, a ſmall fiſh of a cylindrical ſhape, and about ſix inches long, ſuppoſed by Mr. Ray to be the excochis.

ADONIS *Flos*, in botany, a genus of polyandrious plants, called, in Engliſh, pheaſant's eye, or red maithers. The leaves reſemble thoſe of fennel, or chamomile; the flower is of the roſaceous kind, or compoſed of ſeveral petals diſpoſed in the form of a roſe; and the ſeeds are contained in oblong capſules.

ADOPTIANS, *Adoptiani*, ancient heretics, the followers of Felix of Urgel, and Elipand of Toledo, who, towards the end of the eighth century, advanced the notion, that Jeſus Chriſt is the ſon of God, not by nature, but by adoption.

ADOPTION, an act by which any one takes another into his family, owns him for his ſon, and appoints him for his heir.

The word is Latin, *adoptio*, and derived from *adopto*, to chuſe.

The cuſtom of adoption was very common among the ancient Romans; yet it was not practiſed, but for certain cauſes expreſſed in the laws, and with certain formalities uſual in ſuch caſes: they firſt learnt it from the Greeks, among whom it was called *Υἱοθεσια*.

This adoption was a ſort of imitation of nature, intended for the comfort of thoſe who had no children; wherefore he that was to adopt was to have no children of his own, and to be paſt the age of getting any; nor were eunuchs allowed to adopt, as being under an actual impotency of begetting children; neither was it lawful for a young man to adopt an elder, becauſe that would have been contrary to the order of nature; nay, it was even required that the perſon who adopted ſhould be eighteen years older than his adopted ſon, that there might at leaſt appear a probability of his being the natural father.

ADOPTION, in an eccleſiaſtical ſenſe, is applied to the paſſion of our Saviour, and the communication of the merits of his death, which being applied to us by baptiſm, we become the *adopted* children of God, and have a part in the inheritance of heaven. This is the doctrine taught by St. Paul in ſeveral places, particularly in Rom. viii. 15. Gal. iv. 45.

ADOPTIVE is an epithet applied, in a general ſenſe, to every thing adopted either by ourſelves, or enjoyed by the conceſſion of another. Thus we ſay, adoptive children, adoptive arms, &c.

ADORATION, a part of worſhip the pagans gave their pretended deities: the poſture for this religious regard was putting their hand to their mouth, and kiſſing it.

The word is Latin *adoratio*, and compounded of *ad*, to, and *os*, *oris*, the mouth.

Adoration, in the Holy Scriptures, is taken not only for that veneration or worſhip due to God alone, but likewiſe for thoſe marks of outward reſpect which are paid to ſuperiors. Adoration of both kinds is generally attended with bowing the body very low, and ſometimes with proſtration, or throwing one's ſelf on the earth.

The election of popes is performed two ways, by adoration, and by ſcrutiny. In election, by adoration, the cardinals ruſh haſtily, as if agitated by ſome ſpirit, to the adoration of ſome one among them, to proclaim him pope. When the election is carried by ſcrutiny, they do not adore the new pope till he is placed on the altar.

ADOSCULATION, a term uſed by Dr. Grew, to imply a kind of impregnation, without intromiſſion; and in this manner he ſuppoſes the impregnation of plants is effected, by the falling of the farina fœcundans on the piſtil

ADOSSEE, in heraldry, implies any two animals placed back to back.

AD QUOD DAMNUM, in law, a writ, which ought to be iſſued before the king grants certain liberties, as a fair, market, or the like; ordering the ſheriff to enquire what damage is like to be the conſequence of ſuch a grant.

ADRACANTH, the ſame with tragacanth. See the article TRAGACANTH.

ADRACHNE, a name given by ſome botaniſts to a ſpecies of the arbutus, or ſtrawberry-tree. See ARBUTUS.

ADRAMMELECH, in mythology, a deity worſhipped by the inhabitants of Sepharvaim, a people planted in the Holy Land by the kings of Aſſyria, after Salmanazer had taken Samaria, and put a final period to the kingdom of Iſrael. The worſhippers of Adrammelech burnt their children in the fire to the honour of that idol.

It is a Perſian word, and ſignifies, "the magnificent "king."

ADRAMUS, in mythology, is the name of a deity peculiar to Sicily, and was worſhipped in the city of Adram, which thence obtained its name.

ADRASLIA, in antiquity, a kind of Pythian games, celebrated at Argos.

ADRIANISTS, in eccleſiaſtical hiſtory, a ſect of heretics divided into two branches; the firſt were diſciples of Simon Magus, and flouriſhed about the year 34. Theodoret is the only perſon who has preſerved their name and memory; but he gives us no account of their origin. Probably this ſect, and the ſix others which ſprung from the Simonians, took their name from the particular diſciples of Simon. The ſecond were the followers of Adrian Hamſtead, the anabaptiſt, and held ſome particular errors concerning Chriſt. *Bingham's Antiq.*

ADSTRICTION, among phyſicians, implies a too great rigidity and cloſeneſs of the emunctories of the body, particularly in the pores of the ſkin, whereby inſenſible perſpiration is obſtructed.

The word is Latin, *adſtrictio*, and compounded of *ad*, to, and *ſtringo*, to bind.

AD TERMINUM *Qui præteriit*, in law, is a writ of entry which lies for the leſſor or his heirs, if after the expiration of a leaſe, whether it be for years or life, the leſſee, or other occupier of the land, &c. refuſes to quit the premiſes.

ADVANCED, in a general ſenſe, implies ſomething placed or ſituated before another.

ADVANCED *Ditch*, in fortification, is the ditch ſurrounding the glacis or eſplanade of a place.

ADVANCED *Guard*, in military affairs, denotes the firſt line of an army marching towards an enemy. But it is more particularly uſed to ſignify a ſmall party of horſe ſtationed before the main guard.

ADVANCER, among ſportſmen, denotes one of the ſtarts, or branches of a buck's attire, between the back antler and the palm.

ADUAR, a kind of ambulatory village, conſiſting of tents, which the Moors and Arabians move from one place to another as ſuits their conveniency, or the country affords paſture for the cattle and flocks.

ADVENT, a feſtival in the Chriſtian church; being the four Sundays immediately preceding Chriſtmas.

In the Ambroſian office, Advent has ſix weeks, and St. Gregory, in his Sacramentary, allowes it five. It is appointed to employ the thoughts of Chriſtians on the firſt Advent, or coming of Chriſt in the fleſh, and his ſecond Advent, or coming to judge the world. The primitive Chriſtians practiſed great auſterity during this ſeaſon. At firſt they faſted three days in the week, but were afterwards obliged to faſt every day.

ADVENTITIOUS, whatever advenes, or is extrinſically added to a body or thing. Thus adventitious matter is that which is joined fortuitouſly to a body.

ADVENTITIOUS, among civilians, implies ſuch goods or effects as are acquired accidentally, or by the liberality of a ſtranger. It alſo ſignifies thoſe effects which a perſon acquires by collateral, not by direct, ſucceſſion.

AD VENTREM *Inſpiciendum*, in law, is a writ commanding a woman to be ſearched, whether ſhe be or be not with child by a former huſband, on her with-holding lands from the heir.

ADVERB, in grammar, is a word joined to a verb, adjective, &c. and ſolely applied to the uſe of qualifying and reſtraining the latitude of their ſignification.

The word is Latin, *adverbium*, and compounded of *ad*, to, and *verbum*, a verb, q. d. a word added to a verb.

Adverbs, though very numerous, may be reduced to certain claſſes, the principal of which are thoſe of order, of place, of time, of quantity, of quality, of manner, of affirmation, of doubting, of compariſon, and of interrogation.

ADVERBIAL, ſomething belonging to adverbs. Thus we ſay, adverbial expreſſions, and adverbial numbers.

ADVERSARIA, a kind of common-place book, uſed by men of letters for entering whatever occurs to them worthy of notice either in reading or converſation.

The word is Latin, and compounded of *ad*, to, and *verto*, to turn.

ADVERSARY, in a general ſenſe, denotes an enemy, or one that oppoſes another.

The word is formed from the Latin prepoſition, *adverſus*, againſt, compounded of *ad*, againſt, and *verto*, to turn.

ADVERSARY, in law, ſignifies either of the contending parties, conſidered as oppoſing each other.

Letter of ADVICE, in commerce, implies a letter ſent by the drawer of a bill of exchange, or the remitter of goods, &c. to his correſpondent, informing him that he has drawn ſuch a bill, or ſent ſuch a quantity of merchandize, by ſuch a ſhip, or other conveyance.

No perſon ſhould either accept or pay a bill of exchange without ſuch letter of advice, which ſhould contain the name of the perſon in whoſe favour it is drawn, the date of the bill, and the ſum drawn for.

ADULTERATION, in a general ſenſe, ſignifies the act of debaſing, by ſome improper mixture, ſomething that was pure and genuine.

The word is Latin, *adulteratio*, and derived from *adultero*, to debaſe.

ADULTERATION *of Coin*, is the making it of a baſer metal, or adding a greater proportion of alloy than is uſed in the genuine and ſtandard coin. All nations have conſidered this action as a capital offence.

ADULTERATION, in pharmacy, is the act of uſing ingredients of leſs virtue in a medicinal compoſition, in order to ſave expence. This pernicious practice has greatly impeded the progreſs of the healing art, and too often proved of fatal conſequence to the patient. We wiſh ſuch ungenerous practice, to call it by no harſher name, was baniſhed from the world, but this we fear will never be the caſe, at leaſt till private emolument ſhall be leſs purſued than the good of mankind in general.

ADULTERY, the crime committed by married perſons, whether man or woman, who, in violation of their marriage vow, have carnal commerce with another beſides the perſon to whom they plighted their faith.

The Moſaic law commanded that both the man and the woman who had been guilty of adultery ſhould be put to death.

The Greeks as well as the Romans enacted ſevere laws againſt adulterers. Solon, the wiſe law-giver of the Lacedemonians, made it lawful to kill the adulterer, and enacted that the woman ſhould be puniſhed, by ſtripping her of the ornaments belonging to her quality, by baniſhing her from all religious aſſemblies, and indeed from all ſociety in general. The Thurians had an expreſs law, that perſons guilty of this crime ſhould be repreſented upon the ſtage, and conſequently expoſed to public infamy.

Among the primitive Chriſtians adulterers were not admitted to the communion till they had done ſeven years penance in faſting and ſackcloth, in ſevere afflictions and ſorrow, according to the diſcipline of thoſe ages.

The Saxons formerly burnt the adultereſs, and erected a gibbet over her aſhes, whereon they hanged the adulterer.

Among the Danes and Saxons in England, the puniſhment of an adulterer was the ſame with that of a murderer. At preſent adultery is conſidered as a ſpiritual offence, and therefore the injured party can only bring his action of damages againſt the adulterer; while all the puniſhment the adultereſs receives is the being divorced from her huſband, and ſtripped of her dower. But perhaps the laying a heavy fine upon the man, and ſtripping the woman of her riches, is a more probable method of preventing the frequency of adultery than more ſevere methods.

ADULTERY, in the language of ſcripture, ſometimes implies idolatry, or the worſhipping of falſe gods.

ADVOCATE, among the Romans, implied a perſon ſkilled in their law, and who undertook the defence of cauſes at the bar.

The word is Latin, *advocatus*, and compounded of *ad*, to, and *voco*, to call; q. d. a perſon called in to the aſſiſtance of another.

The Romans had a very high opinion of the profeſſion of advocates; ſo that the ſeats at their bar were crouded with ſenators and conſuls; and the ſame voices that commanded the people, were alſo employed in defending them. The emperors therefore preferred the gown to the ſword, giving the advocates the title of Comites, Honorati, Clariſſimi, and even Patroni, thinking their clients were not leſs obliged to them, than the freedmen were to their maſters for giving them their liberty. But this order in proceſs of time greatly debaſed itſelf, the bar became venal, and the advocates mercenary. The tribune Cynicus, therefore, procured a law to be paſſed, forbidding advocates to take money from their clients; but this was found ineffectual, and the venality of the advocates continued, notwithſtanding the utmoſt efforts of the tribune.

The word advocate is ſtill uſed in countries where the civil law obtains, to imply thoſe who plead the cauſe of clients at the bar. In Scotland there is a college of advocates, conſiſting of one hundred and eighty perſons, appointed to plead all actions before the lords of ſeſſion.

Lord ADVOCATE, one of the officers of ſtate in Scotland, who pleads in all cauſes of the crown, or wherein the king is concerned.

ADVOCATE, in eccleſiaſtical hiſtory, ſignifies a perſon whoſe function it was to defend the laws and revenues of the church and its religious communities.

Conſiſtorial ADVOCATES are officers of the apoſtolic chamber, who plead in the conſiſtories at Rome.

Fiſcal ADVOCATE, in Roman antiquity, was an officer of ſtate under the Roman emperors, who pleaded in all cauſes wherein the fiſcus or treaſury was concerned.

ADVOWEE, in law, ſignifies the patron of a church, or the perſon who has the right of preſentation to a benefice.

ADVOWSON, in law, the right of patronage, or of preſenting to a vacant benefice.

Advowſons are either appendant or in groſs; the former depend upon, and paſs as appurtenances to a manor of lands; but the latter is a right of preſentation ſubſiſting by itſelf, and belonging to a perſon, without any relation to manors or lands.

In both caſes, however, advowſons are equally the property of the patrons as their landed eſtate; and may accordingly be granted away by deed or will, and become aſſets in the hands of executors.

ADUST, among phyſical writers, is a term applied to ſuch fluids of the human body as are become of a hot and fiery nature.

The word is Latin, *aduſtus*, and compounded of *ad*, and *uro*, to burn.

ADUSTION, in the healing art, implies an inflammation of the parts about the brain and its membranes, attended with a hollowneſs of the eyes, a pale colour, and dryneſs of the body.

ADY, in botany, the name of a ſpecies of palm-tree, found in the iſland of St. Thomas. The fruit reſembles a lemon both in ſize and ſhape, and contains an aromatic kernel, whence an oil is expreſſed, which is uſed inſtead of butter by the inhabitants.

ADYTUM, in antiquity, the moſt retired and ſacred part of the heathen temples, into which none but the prieſts were ſuffered to enter, and from whence oracles were delivered.

The word is Greek, *αδυτον*, inacceſſible, and compounded of *α*, priv. and *δυνω*, or *δυω*, to enter.

ADZE, a kind of crooked ax uſed by ſhipwrights, coopers, &c.

Æ, among grammarians, a diphthong or double vowel, compoſed of A and E.

Grammarians are not agreed with regard to the uſe of this diphthong in the Engliſh language; ſome being for retaining it in all words where it was uſed by the ancients, and others for laying it totally aſide, and ſupplying its place with the ſingle E. Mr. Johnſon is of the latter opinion, and obſerves, that it ſeems not properly to have any place in the Engliſh alphabet.

ÆCEA, in antiquity, were ſolemn feaſts and games celebrated at Ægina, in honour of Æacus, who, on account of the ſtrict juſtice he diſpenſed upon earth, was feigned to have been appointed one of the judges in hell.

ÆCHMALOTARCH, in antiquity, a title given to the principal leader and governor of the Hebrew captives reſiding at Chaldæa, and the neighbouring countries.

The word is Greek, *αιχμαλωταρχης*, and compounded of *αιχμη*, war, and *αλωτος*, a captive.

The Jews themſelves call this magiſtrate *Roſch-galuth*, chief or prince of the captivity, and pretend that there has always been a continual ſucceſſion of theſe princes, from the time the Hebrews were carried away captive from Judea, to this day. But Baſnage aſſures us, that there was no æchmalotarch before the end of the ſecond century; and Prideaux has ſhewn, that the æchmalotarch, at preſent, is nothing more than the head of their religion, like the epiſcopus Judæorum in England, the altarch at Alexandria, and the ethnarch at Antioch.

ÆDILE, *Ædilis*, among the ancient Romans, implied a magiſtrate, whoſe chief buſineſs conſiſted in ſuperintending edifices of all kinds, eſpecially thoſe which belonged to the public, as temples, aqueducts, bridges, &c.

They had alſo the care of the high-ways, public places, weights, and meaſures. The prices of proviſions were alſo fixed by the ædiles, who likewiſe took cognizance of debauchees, puniſhed lewd women, and ſuch perſons as frequented gaming-houſes. They had the cuſtody of the plebiſcita, or orders of the people; inſpected all comedies, and other pieces of wit; and were obliged to exhibit magnificent games to the people at their own expence.

There were originally only two ædiles, who were choſen out of the common people; but perſons of this claſs being unable to ſupport the enormous expence attending their office, two others were created out of the patrician order: theſe took upon themſelves the charges of the games, and were called *ædiles curules*, or *majores*, as the two plebeians were ſtiled *minores*.

Julius Cæſar, in order to eaſe theſe four magiſtrates, increaſed their number to ſix, calling the two additional ones *ædiles cereales*, from their having the inſpection of all manner of grain committed to their care.

ÆGILOPS, in ſurgery, an abſceſs formed in the corner of the eye next the noſe.

The word is Greek, *αιγιλωψ*, and compounded of *αιξ*, a goat, and *ωψ*, an eye; becauſe the patient afflicted with an ægylops has a caſt in the diſeaſed eye, reſembling that of a goat.

In the beginning of this diſorder, a tumour with, and ſometimes without, an inflammation, appears often ſuperficially; but at others ſeated ſo deep, that unleſs the part be preſſed with the finger, it cannot be perceived. The matter contained in this tumour is ſo ſharp and purulent, that it corrodes not only the ſkin, but even the lachrymal ducts, the fat ſeated near the ſinuſes of the eye, and ſometimes the bones called oſſa plana, as well as the adjacent bones of the noſe, frequently cauſing a dangerous caries. Sometimes the inferior and ſuperior lachrymal ducts are ſo totally eroded, that the tears, mixed with the matter, continually flow into the eye, from the puncta lachrymalia, and at laſt cauſe a true fiſtula lachrymalis.

As the inflammation in the ægilops tends rather to ſuppuration than reſolution, the tumour muſt be brought to maturation as ſoon as poſſible, leſt it generate into a troubleſome fiſtula. The applications proper for this purpoſe are emollient cataplaſms, or plaiſters of diachylon with the gums. But as ſoon as the matter is known to be formed, the lower part of the tumour ſhould be opened with a knife or lancet, the matter gently preſſed out, and the ulcer carefully deterged and healed in the common manner. If the ulcer breaks ſpontaneouſly, as it often does, and the aperture be ſo ſmall that the matter cannot diſcharge itſelf, it ought immediately to be enlarged with a piece of prepared ſpunge or gentian root, or with the knife. After which it muſt be treated like other ulcers. If the bone be found to be carious, it will be proper to dreſs it with lint dipt in ſpirit of vitriol, or the eſſence of euphorbium. And over the common dreſſings, a compreſs dipt in lime-water muſt be applied, till the caries is removed, and the wound fit for healing. *Heiſter's Surgery.*

ÆGIS, in mythology implies the ſhield of Jupiter and Pallas, or Minerva.

The word is Greek, *αιγις*, and derived from *αιξ*, *αιγος*, a ſhe-goat; becauſe Jupiter covered his ſhield with the ſkin of Amalthea, the name of the goat that ſuckled him.

It is added that Jupiter, having made a preſent of this buckler to Minerva, the goddeſs fixed the head of Meduſa on the middle of the ſhield, by which means all thoſe who looked on it were turned into ſtone.

ÆGOLETHRON, in botany, the name of a plant which Pliny ſays, grows in Pontus, and whoſe flowers, in a moiſt ſpring, acquire a poiſonous quality.

The word is Greek, and compounded of *αιξ*, a goat, and *ολεθρος*, deſtruction; becauſe it kills thoſe goats which feed upon its leaves.

Tournefort deſcribes a plant by the name of *Chamædendros Pontica, maxima, meſpili folio, flore luteo*, which he takes for the ægolethron of Pliny, and which he found in Aſia. He adds, that the inhabitants of thoſe parts have a tradition, probably founded on repeated obſervations, that the honey which the bees extract from the flowers of this plant, ſtupifies thoſe that eat it, and cauſes a vomiting. This is conformable to what Dioſcorides and Pliny relate of the honey extracted from the ægolethron. We find a ſtrange effect produced by this honey recorded by Xenophon, in his account of the famous retreat of the ten thouſand Greeks under his command. He tells us, that in the neighbourhood of Trebezonde, the ſoldiers finding great plenty of honey, excellent in flavour, eat greedily of it, and were all ſeized with a ſtrange giddineſs, ſome wallowing upon the ground like men dead drunk, while others were ſeized with a kind of phrenzy; ſo that the ground appeared like a field of battle, covered with dying men, every mortal ſymptom appearing in the objects thus affected. Theſe ſymptoms, however, diſappeared in about twenty-four hours, nature throwing off the morbific matter by violent vomitings and purgings.

ÆGYPTIACUM, in pharmacy, the name of a detergent ointment greatly uſed by ſurgeons in cleanſing old and foul ulcers.

It is compounded of verdigriſe, honey, and vinegar, boiled to a proper conſiſtence. Authors are not agreed with regard to the origin of the name. Aetius ſays the appellation was acquired from an *Ægyptian* phyſician, who uſed a compoſition of this kind, at leaſt one wherein verdigriſe was a principal ingredient, in the cure of an achor. But Dr. Quincy is of opinion, that it owes its name to the colour of the compoſition, which is a duſky brown, reſembling that of the ſkins of the *Ægyptians*.

Mel ÆGYPTIACUM, the ſcum of the above ointment taken off while the medicine is boiling to a proper conſiſtence. It is of nearly the ſame properties, and uſed in the ſame intentions as the former.

ÆLURUS, in mythology, a deity worſhipped by the ancient *Ægyptians*, under the form of a cat, or of a man, with the head of that animal.

F. Montfaucon has given a figure of this ancient deity, on the head of which is a large vaſe, crowned with a globe. The head is alſo encircled with rays, it being the cuſtom among that people to repreſent all their deities as having ſome relation to the ſun. They had likewiſe a goddeſs, whom they repreſented under the figure of a woman with the head of a cat.

The *Ægyptians* had ſo ſuperſtitious a regard for this animal, that the killing it, whether by accident or deſign, was puniſhed with death: and Diodorus relates, that, in the time of extreme famine, they choſe rather to eat one another, than touch theſe ſacred animals.

AEM, or AAM. See AAM.

ÆNIGMA, a dark or perplexed queſtion, in which ſome well known object is concealed under an obſcure deſcription.

The word is Greek, *αινιγμα*, and derived from *αινος*, an obſcure propoſition.

ÆNIGMATICAL, ſomething belonging to, or delivered in, the perplexed manner of an ænigma.

ÆOLIC *Dialect*, among grammarians, one of the five dialects of the Greek tongue, uſed by the inhabitants of Æolia.

ÆOLIC *Verſe*, in proſody, is a verſe conſiſting of an iambus, or ſpondee, then of two anapeſts, ſeparated by a long ſyllable, and laſtly of another ſyllable.

ÆOLIPILE, in hydraulics, is a hollow ball of metal, generally uſed in courſes of experimental philoſophy, in order to ſhew that it is poſſible to convert water into an elaſtic ſteam or vapour by heat.

The inſtrument, therefore, conſiſts of a ſlender neck, or pipe, having a narrow orifice inſerted into the ball by means of a ſhouldered ſkrew. This pipe, being taken out, the ball is filled almoſt full of water, and the pipe being again ſcrewed in, the ball is placed on a pan of kindled charcoal, where it is well heated, and there iſſues from the orifice a vapour, with prodigious violence and great noiſe, which continues till all the included water is diſcharged. The ſtronger the fire is, the more elaſtic and violent will be the ſteam; but care muſt be taken that the ſmall orifice of the pipe be not, by any accident, ſtopped up; becauſe the inſtrument would in that caſe infallibly burſt in pieces, with ſuch violence as may greatly endanger the lives of the perſons near it.

Another way of introducing the water is to heat the ball red hot when empty, which will drive out almoſt all the air, and then by ſuddenly immerging it in water, the preſſure of the atmoſphere will force in the fluid, till it is nearly full. Some have imagined, that the æolipile may be employed as bellows to blow up a fire, by being heated before it; but experience ſoon convinced them of their miſtake; for they found that the blaſt, inſtead of kindling, totally extinguiſhed the fire.

The body of this inſtrument conſiſts of two parts, A and B (See plate VII. *fig.* 2.) ſoldered together. On the upper part is faſtened the pipe CD, whoſe orifice at D is about one fourth, or one fifth in diameter. Des Cartes and others have uſed this inſtrument to account for the natural cauſe and generation of the wind; and hence it was called *Ælopila*, q. d. *pila Æoli*, the ball of Æolus, or god of the winds. This inſtrument was not unknown among the ancients; for it is mentioned by Vitruvius, lib. 1. cap. 6. F. Merſennus, prop. 29. of his *Phænom. Pneumat.* has alſo mentioned it; and Varenius, in his *Geograph.* cap. xix. uſes it to ſhew the rarefaction of the air by fire.

ÆOLUS, in mythology, the pagan god of the winds. He was the ſon of Hippotas, by Menecla, the daughter of Hyllus, king of Lipara. He dwelt in the iſland Strongyle, one of the ſeven iſlands that are called Æolian, as being all under the dominion of Æolus. Others ſay, that his reſidence was in the iſland Lipara: others again place him at Rhegium, in Italy. But all agree in giving him an abſolute authority over the winds, which they ſay he confined in a vaſt cavern, and let looſe whenever he pleaſed.

Harp of ÆOLUS, a muſical inſtrument, ſo contrived that, being properly placed in a current of air, emitted thro' an aperture in the window of an apartment, produces admirable muſic merely by the wind playing on the ſtrings. This inſtrument is mentioned by father Kircher; but owes its perfection to Mr. Oſwald of London.

ÆON, a Greek word, properly ſignifying the age or duration of any thing.

ÆON, among the followers of Plato, was uſed to ſignify any virtue, attribute, or perfection: and hence they repreſented the Deity as an aſſemblage of all poſſible æons, and called him pleroma, a Greek term, ſignifying fullneſs.

The Valentinians, who, in the firſt ages of the church, blended the conceits of the Jewiſh cabaliſts, the Platoniſts, and the Chaldean philoſophers, with the ſimplicity of the Chriſtian doctrine, invented a kind of Theogony, calling the ſelf originated Deity, or God the father, by the names of *Bythus*, i. e. profound or unfathomable; and "the "moſt high and ineffable father;" and the ſeveral ſubordinate deities by different appellations; but included all under the general name of æons. See the article VALENTINIANS.

ÆQUATION.	See	EQUATION.
ÆQUATOR.		EQUATOR.
ÆQUINOX.		EQUINOX.
ÆQUINOCTIAL.		EQUINOCTIAL.

ÆRA, in chronology, is a fixed point of time from which chronologers reckon. Æras are either Chriſtian, Jewiſh, Heathen, or Mahometan. Chriſtian æras are deduced either from the birth of Chriſt, from the emperor Diocleſian, or the beginning of the world. Chronologers differ as to the true point of time in which Chriſt was born: ſome place it two years, others four, and ſome five, before the vulgar æra, which is that in general uſed among the Chriſtians.—For the different æras, or epochas, uſed by chronologers, ſee the article EPOCHA.

AERIAL, an epithet applied to every thing partaking of the nature of air, or that is connected with, or belongs to, the air.

The word is formed from the Greek, *αηρ*, air.

AERIAL *Tides*. See TIDES.

AERIANS, in eccleſiaſtical hiſtory, a ſect of heretics who ſeparated themſelves from the church party in the reign of Conſtantine the Great, and during the pontificate of Julius I. about the year 342. They had their name from one Aerius, a preſbyter, who, thinking himſelf neglected by not being advanced to the dignity of a biſhop, went over to the Arian party; but held ſome opinions peculiar to himſelf, as, that there was no diſtinction, founded in Scripture, between preſbyter and biſhop. He alſo aſſerted that we are not obliged to obſerve the ſtated feaſts of the church, admitted thoſe only into his ſect who lived in continence, and condemned marriage as unlawful.

AEROGRAPHY, a deſcription of the air.

The word is Greek, and compounded of αηρ, air, and γραφω, to deſcribe.

AEROLOGY, an account of the nature and properties of the air.

The word is Greek, and compounded of αηρ, air, and λογος, a diſcourſe.

AEROLOGICE, among phyſicians, implies that part of medicine which relates to the air, its properties and uſes in the animal œconomy, and its efficacy in preſerving and reſtoring health.

AEROMANCY, a ſpecies of divination among the ancients, performed by obſerving the air, winds, &c.

The word is Greek, and compounded of αηρ, air, and μαντεια, divination.

Aeromancy is alſo uſed by ſome writers to ſignify the art of foretelling the various changes of the air and weather, by means of barometers, hydrometers, thermometers, &c.

AEROMETRY, the ſcience of meaſuring the air.

The word is Greek, and compounded of αηρ, air, and μετρεω, to meaſure. It comprehends not only the doctrine of the air itſelf, conſidered as a fluid body, but alſo its preſſure, elaſticity, rarefaction, and condenſation. See Elasticity, Rarefaction, and Condensation.

The term is at preſent not much in uſe, this branch of natural philoſophy being more frequently called pneumatics. See Pneumatics.

Baron Wolfius, late profeſſor of mathematics at Hall, having reduced ſeveral properties of the air to geometrical demonſtrations, firſt publiſhed at Leipſic his Elements of Aerometry in German, and afterwards more enlarged in Latin, which have been ſince inſerted in his *Curſus Mathematicus*, in five vols. in 4to.

ÆRUGINOUS, an epithet applied to ſuch particulars as reſemble ærugo, or the ruſt of copper, either with regard to taſte or colour.

ÆRUGO, in natural hiſtory, properly ſignifies the ruſt of copper, whether natural or artificial. The former is found about copper mines, and the latter made by corroding copper-plates with acids. See the article Verdigrise.

ÆS, in natural hiſtory, ſignifies copper. It is alſo uſed for money coined of that metal.

Æs, Æsculanus, or Æres, in mythology, the deity who preſides over the coinage of copper money. He is repreſented with a ſceptre in his left hand, and a balance in his right.

Æs *Uſtum*, a chemical preparation, made of thin leaves of copper, ſulphur, and nitre, placed *ſtratum ſuper ſtratum* in a crucible, and ſet in a charcoal fire, till all the ſulphur is conſumed; after which, the copper is taken out of the crucible and reduced to powder. Some quench the leaves of copper in vinegar, and repeat the calcination.

Its principal uſe is in colouring glaſs, to which it gives a beautiful tincture. The ſurgeons uſe it as a deterſive; and ſome have given it internally: but it is certainly a very dangerous medicine, and ſhould be avoided.

ÆSALON, in natural hiſtory, a ſpecies of long-winged hawk, generally called, in Engliſh, the merlin. See Merlin.

ÆSCHNA, in natural hiſtory, the name of a four-winged water-fly, with a long body, hairy near the tail.

ÆSCHYNOMENOUS, an epithet ſometimes applied to a genus of vegetables, generally called ſenſitive plants, which contract their leaves on the approach of the hand, as if ſenſible of the touch.

The word is Greek, αισχυνομενος, and derived from αισχυνομαι, to be aſhamed.

ÆSCULANUS, in mythology. See Æs.

ÆSCULAPIUS, in mythology, the god of phyſic. The poets ſay he was ſon of Apollo, by the nymph Coronis; who, afterwards favouring a Thracian youth, named Iſchys, was ſtruck through with darts by Apollo: but he, repenting the action, opened her womb, and taking out the child, called him Æſculapius, and committed the care of his education to Chiron.

Snake of Æsculapius, *Anguis Æſculapii*, in natural hiſtory, is a harmleſs kind of a ſerpent, of an oblong ſhape, an ell in length, and of a yellowiſh, or rather porraceous, colour, except on the back, where it is brown. Both jaws are armed with many very ſharp teeth, and on the neck are two ſmall eminences. Theſe ſerpents are very common in Spain, Italy, and other warm countries.

Seba has mentioned the following ſeven ſorts of æſculapian ſerpents; the firſt has the whole body encircled from the head to the tail, with broad brown and black ſtreaks; and the ſcales which cover the body are of an aſh colour, and grey mixed with white.

The Braſil ſerpent, variegated with divers colours, is defended with ſtrong ſcales of a dull blue colour, mixed with black, and finely undulated. The head is curiouſly mottled and ſpeckled, and the tranſverſe ſcales on the belly are moſtly white.

The æſculapian ſerpent of Panama in America has a bluiſh violet coloured body, and the belly is of a paler blue, with tranſverſe large white ſcales, joined cloſe together, except at the bending of the back, where they are all ſeparated The head is covered with long broad uniform ſcales. The mouth is armed with ſharp crooked teeth; and it lives upon mice and ſmall birds. Its excrements ſmell like muſk.

The argoli is an American ſerpent, of the æſculapian kind. The ſcales are rhomboidal, and of a greyiſh black, with large bay brown ſpots, ſome of which are round, and others oblong; but the belly is whitiſh, and the tail terminates in a point.

Another ſpecies of argoli is of the ſame kind. Its ſcales are of a whitiſh aſh colour, diſpoſed in a beautiful manner, and more exactly than in the former. The tail is blunt at the end, and the head and eyes ſhining and fiery.

The æſculapian ſerpent of Braſil is near three ells in length, with the head covered with large beautiful ſcales, and the neck ſurrounded by a narrow collar. The ſcales on the body are white, and in the ſhape of lozenges, each being marked in the middle with a ſmall black furrow. From the neck to the tail there are large red and brown ſpots, which are longiſh near the head, and ſhorter as they approach to the tail. The mouth is armed with very ſmall teeth.

The æſculapian ſerpent of the Eaſt Indies is very large, and the upper part of the body is covered with yellow ſcales, ſhaded with duſky brown, and ſhine remarkably. It is encircled with bay brown ſtreaks, ſome of which are narrow, others broad. The ſcales on the ſides, and under the belly, are of a yellowiſh aſh colour; the head is little, ſhort, and prettily variegated with black and brown; the forehead is marked with two whitiſh ſpots, and the neck is ſurrounded with a white ring. The teeth are very ſmall, the body is round and fleſhy, and the tail blunt. *Brookes's Natural Hiſt.*

ÆSNECY, in law, ſignifies the priority of age among coparceners. See Coparceners.

ÆSTIVAL, ſomething belonging to, or connected with, the ſummer. Thus the æſtival ſolſtice is the ſame with the ſummer ſolſtice.

The word is Latin, *æſtivus*, and derived from *æſtas*, ſummer.

ÆSTUARY, in geography, implies an arm of the ſea, running a conſiderable way into the land.

The word is Latin. *æſtuarium*, and derived from *æſtus*, a tide or eddy, there being generally very ſtrong tides in theſe inlets.

Æstuary, among phyſicians, implies a vapour-bath, or any other contrivance for conveying heat to the whole, or any particular part of the body.

The word in this ſenſe is derived from *æſtus*, heat.

ÆTHER, in philoſophy, a very thin elaſtic fluid, readily pervading the pores of all bodies, and expanded through every part of ſpace.

The word is Greek, αιθηρ, and derived from αιθω, to burn; becauſe the ancient philoſophers ſuppoſed it to be of the nature of fire.

Philoſophers have always been greatly divided in their opinions with regard to this ſubtile fluid; and ſome have even queſtioned its exiſtence. The following account of the æther is taken from Sir Iſaac Newton's optics, where that great philoſopher has delivered his ſentiments in a ſeries of queſtions or queries.

If in two large tall cylindrical veſſels of glaſs inverted, two little thermometers be ſuſpended ſo as not to touch the veſſels, and theſe veſſels, thus prepared, be carried out of a cold place into a warm one; the thermometer in vacuo will grow warm as much, and almoſt as ſoon, as the thermometer which is not in vacuo; and, when the veſſels are carried back into the cold place, the thermometer in vacuo will grow cold almoſt as ſoon as the other thermometer. Is not the heat of the warm room conveyed through the vacuum by the vibrations of a much ſubtiler medium than air, which after the air was drawn out remained in the vacuum? And is not this medium the ſame with that medium by which light is refracted and reflected, and by whoſe vibrations light communicates heat to bodies, and is put into fits of eaſy reflection and eaſy tranſmiſſion? And do not the vibrations of this medium, in hot bodies, contribute to the intenſeneſs and duration of their heat? And do not hot bodies communicate their heat to contiguous cold ones, by the vibrations of this medium propagated from them into the cold ones? And is not this medium exceedingly more rare and ſubtile than the air, and exceedingly more elaſtic and active? And doth it not readily pervade all bodies? And is it not, by its elaſtic force, expanded through all the heavens?

Does not the refraction of light proceed from the different denſity of this ætherial medium in different places, the light receding always from the denſer parts of the medium? And is not the denſity thereof greater in free and open ſpaces, void of air and other groſſer bodies, than within the pores of water, glaſs, cryſtal, gems, and other compact bodies? For when light paſſes through glaſs or cryſtal, and falling very obliquely upon the farther ſurface thereof, is totally reflected, the total reflection ought to proceed rather from the denſity and vigour of the medium without and beyond the glaſs, than from the rarity and weakneſs thereof.

Doth not this ætherial medium, in paſſing out of water, glaſs, cryſtal, and other compact and denſe bodies, into empty ſpaces, grow denſer and denſer by degrees, and by that means refract the rays of light, not in a point, but by bending them gradually in curve lines? And doth not the gradual condenſation of this medium extend to ſome diſtance from the bodies, and thereby cauſe the inflections of the rays of light, which paſs by the edges of denſe bodies, at ſome diſtance from the bodies?

Is not this medium much rarer within the denſe bodies of the ſun, ſtars, planets, and comets, than in the empty celeſtial ſpaces between them? And in paſſing from them to great diſtances, doth it not grow denſer and denſer perpetually, and thereby cauſe the gravity of thoſe great bodies towards one another, and of their parts towards the bodies; every body endeavouring to go from the denſer parts of the medium towards the rarer? For if this medium be rarer within the ſun's body than at its ſurface, and rarer there than at the hundredth part of an inch from its body, and rarer there than at the fiftieth part of an inch from its body, and rarer there than at the orb of Saturn; I ſee no reaſon why the increaſe of denſity ſhould ſtop any where, and not rather be continued through all diſtances from the ſun to Saturn, and beyond. And though this increaſe of denſity may at great diſtances be exceeding ſlow, yet, if the elaſtic force of this medium be exceeding great, it may ſuffice to impel bodies from the denſer parts of the medium towards the rarer, with all that power which we call gravity: and that the elaſtic force of this medium is exceeding great, may be gathered from the ſwiftneſs of its vibrations. Sounds move about 1140 Engliſh feet in a ſecond of a minute of time, and in ſeven or eight minutes of time, they move about 100 Engliſh miles. Light moves from the ſun to us in about ſeven or eight minutes of time, which diſtance is about 70000000 Engliſh miles, ſuppoſing the horizontal parallax of the ſun to be about 12″. And the vibrations or pulſes of this medium, that they may cauſe the alternate fits of eaſy tranſmiſſion and eaſy reflection, muſt be ſwifter than light, and by conſequence above 700000 times ſwifter than ſounds; and therefore the elaſtic force of this medium, in proportion to its denſity, muſt be above 700000 × 700000 (that is, above 490000000000) times greater than the elaſtic force of the air is in proportion to its denſity. For the velocities of the pulſes of elaſtic mediums are in a ſubduplicate ratio of the elaſticities and the rarities of the mediums taken together.

As attraction is ſtronger in ſmall magnets than in great ones, in proportion to their bulk; and gravity is greater in the ſurfaces of ſmall planets than in thoſe of great ones, in proportion to their bulk; and ſmall bodies are agitated much more by electric attraction than great ones; ſo the ſmallneſs of the rays of light may contribute very much to the power of the agent, by which they are refracted. And ſo, if any one ſhould ſuppoſe that æther (like our air) may contain particles which endeavour to recede from one another (for I do not know what this æther is), and that its particles are exceedingly ſmaller than thoſe of air, or even than thoſe of light, the exceeding ſmallneſs of its particles may contribute to the greatneſs of the force, by which thoſe particles may recede from one another, and thereby make that medium exceedingly more rare and elaſtic than air, and by conſequence exceedingly leſs able to reſiſt the motions of projectiles, and exceedingly more able to preſs upon groſs bodies, by endeavouring to expand itſelf.

May not the planets and comets, and all groſs bodies, perform their motions more freely, and with leſs reſiſtance in this ætherial medium than in any fluid, which fills all ſpace adequately without leaving any pores, and by conſequence is much denſer than quick-ſilver or gold? And may not its reſiſtance be ſo ſmall, as to be inconſiderable? For inſtance; if this æther (for ſo I will call it) ſhould be ſuppoſed 700000 times more elaſtic than our air, and above 700000 times more rare, its reſiſtance would be above 600000000 times leſs than that of water; and ſo ſmall a reſiſtance would ſcarce make any ſenſible alteration in the motions of the planets in ten thouſand years. If any one would aſk how a medium can be ſo rare, let him tell me how the air, in the upper parts of the atmoſphere, can be above an hundred thouſand thouſand times rarer than gold. Let him alſo tell me how an electric body can, by friction, emit an exhalation ſo rare and ſubtile, and yet ſo potent, as by its emiſſion to cauſe ſo ſenſible diminution of the weight of the electric body, and to be expanded through a ſphere, whoſe diameter is above two feet, and yet to be able to agitate and carry up leaf copper, or leaf gold, at the diſtance of above a foot from the electric body? And how the effluvia of a magnet can be ſo rare and ſubtile, as to paſs through a plate of glaſs without any reſiſtance or diminution of their force, and yet ſo potent as to turn a magnetic needle beyond the glaſs?

Is not viſion performed chiefly by the vibrations of this medium, excited in the bottom of the eye by the rays of light, and propagated through the ſolid, pellucid, and uniform capillamenta of the optic nerves into the place of ſenſation? And is not hearing performed by the vibrations either of this or ſome other medium, excited in the auditory nerves by the tremors of the air, and propagated through the ſolid, pellucid, and uniform capillamenta of thoſe nerves into the place of ſenſation? And ſo of the other ſenſes.

Is not animal motion, performed by the vibrations of this medium, excited in the brain by the power of the will, and propagated from thence through the ſolid, pellucid, and uniform capillamenta of the nerves into the muſcles for contracting and dilating them? I ſuppoſe that the capillamenta of the nerves are each of them ſolid and uniform, that the vibrating motion of the ætherial medium may be propagated along them from one end to the other uniformly, and without interruption; for obſtructions in the nerves create palſies. And, that they may be ſufficiently uniform, I ſuppoſe them to be pellucid when viewed ſingly, though the reflections in their cylindrical ſurfaces may make the whole nerve (compoſed of many capillamenta) appear opake and white; for opacity ariſes from reflecting ſurfaces, ſuch as may diſturb and interrupt the motions of this medium.

Æther, in chemiſtry, ſignifies a very remarkable fluid, lighter, more volatile, and more inflammable, than the moſt highly rectified ſpirit of wine. It quickly flies off when expoſed to the air, and ſuddenly catches fire when any flame approaches it. It burns like ſpirit of wine, without the leaſt ſmoke, and conſumes entirely, without leaving the ſmalleſt appearance of a coal or of aſhes. It diſſolves oils, and oily matters, with great eaſe and rapidity. Theſe properties it has in common with an ardent ſpirit: but it reſembles an oil in that it is not miſcible with water; and this makes it eſſentially different from ſpirit of wine, the nature of which is to be miſcible with all aqueous liquors.

Another very ſingular property of æther is its great affinity with gold, exceeding even that of aqua regis. It does not indeed diſſolve gold when in a maſs, and in its metalline form: but if a ſmall quantity of æther be added to a ſolution of gold in aqua regis, and the whole ſhaken together, the gold ſeparates from the aqua regis, joins the æther, and remains diſſolved therein.—The following method of making this æthereal fluid will be found both eaſy and expeditious.

Put into a glaſs retort, two pounds of ſpirit of wine, perfectly dephlegmated, and pour on it at once two pounds of highly concentrated oil of vitriol: ſhake the retort gently ſeveral times, in order to mix the two liquors. This will produce an ebullition, and conſiderable heat: vapours will aſcend with a pretty loud hiſſing noiſe, which will diffuſe a very aromatic ſmell, and the mixture will be of a deeper or lighter red colour, according as the ſpirit of wine was more or leſs oily. Set the retort on a ſand bath, made nearly as hot as the liquor, lute on a turbulated ballon, or large globular receiver, and diſtil the mixture with a fire ſtrong enough to keep the liquor always boiling, a very aromatic ſpirit of wine will firſt come over into the ballon, after which the æther will riſe. When about five or ſix ounces of it are come off, you will ſee, in the upper concavity of the retort, a vaſt number of little points in a veined form, which will appear fixed, and which are nevertheleſs ſo many little drops of æther, rolling over one another, and trickling down into the receiver. Theſe little points continue to appear and ſucceed each other to the end of the operation. Keep up the ſame degree of fire, till, upon opening the little hole in the ballon, you perceive that the vapours, which inſtantly fill the receiver, have the ſuffocating ſmell of volatile ſpirit of ſulphur.

Then unlute the receiver, pour the liquor it contains into a chryſtal bottle, and ſtop it cloſe: there will be about eighteen ounces of it; lute on your receiver again, and continue the diſtillation with a greater degree of fire. There will come over an aqueous acid liquor, ſmelling ſtrong of a ſulphureous ſpirit, which is not inflammable. It will be accompanied with undulating vapours, which being condenſed, will form an oil, moſt commonly yellow, one part of which will float on the ſurface of the liquor, and another will ſink to the bottom.

Towards the end of the diſtillation of this acid liquor, and of the yellow oil of which it is the vehicle, that part of the mixture which is left in the retort, and grown black, will begin to riſe in froth: then ſuppreſs your fire at once, ſtop the diſtillation, and change your receiver once more. When the veſſels are grown pretty cool, finiſh your diſtillation with a lamp-heat kept up for twelve or fifteen days, which in all that time will raiſe but a very little ſulphureous ſpirit. Then break your retort, in which you will find a black ſolid maſs, like a bitumen. It will have an acid taſte, ariſing from a remainder of the acid imperfectly combined with oil.

This artificial bitumen may be freed from its redundant acid, by waſhing it in ſeveral waters. Then put it into a glaſs retort, and diſtil it with a ſtrong reverberated fire; you will obtain a reddiſh oil that will ſwim on water, much like the oil obtained by diſtilling the natural bitumens. This oil alſo will be accompanied with an aqueous acid liquor. In the retort will be left a charred matter, which, being put into an ignited crucible in the fire, burns for ſome time, and, when well calcined, leaves a white earth.

The liquors that riſe firſt in this diſtillation, and which we directed to be kept by themſelves, are a mixture, 1. of highly dephlegmated ſpirit of wine, of a moſt fragrant ſmell; 2. of æther, which the ſpirit of wine wherewith it is united, renders miſcible with water; 3. of a portion of oil, which commonly riſes with æther towards the end of the operation; 4 and ſometimes of a little ſulphureous acid, if the receiver be not changed ſoon enough.

In order to ſeparate the æther from theſe other ſubſtances, put the whole into a retort, with a little oil of tartar per deliquium to abſorb the ſuphureous acid, and diſtil very ſlowly in a ſand bath heated by a lamp, till near half the liquor be come over. Then ceaſe diſtilling; put the liquor in the receiver into a phial with ſome water, and ſhake it; you will ſee it riſe with rapidity to the upper part of the phial, and float on the ſurface of the water: this is the æther, and muſt be poured off, and kept in a bottle with a glaſs ſtopper accurately ground.

Mr. Hellot, in a memoir delivered to the academy of ſciences, has given the following proceſs for preparing æther; by means whereof, by the help of an earthy medium, it is eaſy to diſtil the vinous acid ſpirit containing the æther, without any ſenſible change of ſmell, from the beginning to the end of the operation; without its being ſucceeded by an acid ſulphureous liquor, oil, black ſcum, reſin, or bitumen; and without the neceſſity of taking any great care about the management of the fire, as the liquor may always be kept boiling in the retort, and diſtilled to dryneſs without any danger. This medium is common potter's earth. Mr. Hellot puts ſix ounces thereof, well dried and pulverized, into a large retort, with one pound of ſpirit of wine and eight ounces of vitriol. Theſe he digeſts together three or four days. The mixture acquires no ſenſible colour. He ſets the retort in a ſand-bath, and continues the diſtillation to dryneſs with a moderate charcoal fire. Excepting a few drops that riſe firſt, and which are pure ſpirit of wine, all the reſt of the liquor that diſtils hath conſtantly the ſmell of æther; which is even ſomewhat more penetrating than that of the vinous acid ſpirit obtained without the intervention of the earthy medium.

We have ſeen that the production of the æthereal liquor is owing to a ſemi-decompoſition of the ſpirit of wine, effected by the vitriolic acid during the diſtillation; that this acid, continuing to act, produces a total decompoſition, or perfect ſeparation of the oil and phlegm of the ſpirit of wine from each other; and that the vitriolic acid, uniting with theſe two principles, forms the ſulphureous phlegm, the fluid oil, and the bituminous matter, all frequently mentioned above. Why then, in this experiment of Mr. Hellot's, do we obtain only a ſpirit of wine replete with æther, while none of the other productions appear? The reaſon is a very natural one, and very clear: it is this, the potter's clay containing an earth of that kind which we call abſorbent, becauſe it poſſeſſes the property of uniting with acids, that earth joins with the vitriolic acid in the mixture, reduces it to a neutral ſalt, and thereby prevents its continuing to act upon the ſpirit of wine, as is neceſſary to the total decompoſition thereof. Mr. Hellot ſays, on this occaſion,
" That part of the vitriolic acid turning its action on this
" ſoluble earth or bole, which it finds in the potter's
" clay, ceaſes to act on the inflammable principle of
" the ſpirit of wine; that, conſequently, as there is not
" an immediate and continuous combination of theſe two
" ſubſtances, neither a reſin nor a bitumen can reſult
" therefrom. This is ſo true, that a great part of the oil
" of vitriol may be afterwards recovered from the pot-
" ter's clay as colourleſs as when it was firſt uſed."

Mr. Hellot makes uſe of the following method for procuring the æther from the acid vinous ſpirit obtained by this diſtillation. " You muſt, ſays he, put all this
" liquor into a glaſs body, made of one piece, with its
" head; pour upon it, through the hole in the upper
" part of the head, twice or thrice as much well-water,
" the hardeſt to the taſte, and the moſt impregnated
" with gypſum that can be got. Very pure water, he
" obſerves, produces much leſs æther.

" If the vinous acid ſpirit have ſuch a ſulphureous
" ſmell, as to occaſion a ſuſpicion that it contains a

“ little too much of a volatile vitriolic acid, you muſt add to the water two or three drams of ſalt of tartar, or potaſh to abſorb that acid; and then diſtil with a lamp-heat.

“ While any true æther remains in the mixture, you will ſee it aſcend like a white pillar iſſuing from the midſt of the liquor, and conſiſting of an infinite number of air bubbles inexpreſſibly ſmall. Nothing ſeems to condenſe in the cavity of the head, which always remains clear, without any viſible humidity. The drops which light on the ſides of the receiver, inſtead of forming a net-work thereon, as ſpirit of wine doth when it is a little aqueous, ſpread to the breadth of two inches or more, when they conſiſt of true æther.

“ As ſoon as you perceive this track begin to grow conſiderably narrower, the fire muſt be put out: for what riſes afterwards will be mixed with water, and communicate that fault to the æther already collected in the receiver.

“ Then pour this ætherial liquor into a long bottle, and add to it an equal quantity of well-water. Shake the bottle; the liquor will become milky, and the true æther will inſtantly ſeparate, float upon the water, and mix no more with it. Separate it then by a ſiphon, and keep it in a glaſs bottle ſhut cloſe with a glaſs ſtopple.”

ÆTHERIAL, ſomething belonging to, or partaking of the nature of, æther.

ÆTHERIAL *Oil*, among chemiſts, a ſubtile, eſſential oil, approaching to the nature of ſpirit.

ÆTHIOPIAN *Crown*, in natural hiſtory, the name of a curious ſhell, about three inches in length, and two in breadth; of an oval ſhape. The mouth is long and wide, and cleaves the extremity of the ſhell a little way. The clavicle is ſhort and blunt at the end, and has four turns; that next the body, as well as the upper edge of the body itſelf, are deeply dentated, or, as ſome ſay, crowned; and the teeth are formed into regular even conical points. The ſurface is pretty ſmooth, except a few impreſſions of longitudinal lines, and of a pale browniſh yellow. It is brought from Africa and the Eaſt Indies. *Brookes's Natural Hiſt.*

ÆTHIOPS *Mineral*, in pharmacy, a preparation of mercury, made by rubbing in a glaſs, marble, or iron mortar, equal quantities of quick-ſilver and flowers of ſulphur, till the mercury wholly diſappears, and the whole becomes a black powder.

This is eſteemed one of the ſafeſt preparations of mercury, and is greatly uſed againſt foulneſſes of the ſkin, in ſcrophulous caſes, and in obſtinate venereal caſes. It has been long known as a remedy againſt worms, and is given with great ſucceſs in that complaint. Its doſe is from a ſcruple to a dram.

ÆTHIOPS *of Antimony*, a powerful medicine recommended by Dr. Cockburn, and prepared in the following manner:

Flux equal parts of antimony and ſea-ſalt in a crucible for an hour. When the matter is cold, break the crucible, and knock the ſcoria from the regulus. Then take equal parts of mercury and this regulus, and rub them together till they are incorporated.

This is a very powerful medicine, and will remove moſt chronical diſorders of the ſkin; and is of great ſervice in all kinds of obſtructions. Hence it becomes ſerviceable in the king's evil, and moſt diſeaſes of the glands.

AETIANS, in eccleſiaſtical hiſtory, a ſect of heretics that appeared during the reign of Conſtantius, and in the pontificate of Liberius, about the year 336. They had their name from one Aetius, a Syrian; who being reduced to poverty by the confiſcation of his paternal eſtate, ſet up the trade of a goldſmith; but ſoon after, quitting that employment, applied himſelf to ſtudy, and became a very ſubtile diſputant. He firſt ſettled at Antioch, but, being driven from that city, he hired himſelf, as a menial ſervant, to a certain ſophiſt, at Anazarbus, a city of Cilicia, of whom he learned grammar and logic: but, quarrelling with his maſter about his opinions, he went to Tarſus, and applied himſelf to the ſtudy of divinity. From thence he returned to Antioch, but, being again expelled for the impiety of his opinions, he undertook the practice of phyſic, which he continued till Leontius was promoted to the ſee of Antioch, when that prelate appointed him deacon of his own church; where he continued for ſome time, but afterwards repaired to Alexandria, and oppoſed Athanaſius, openly embracing the party of the Arians.

But beſides the opinions which the Aetians held in common with the Arians, they maintained, that faith, without works, was ſufficient to ſalvation; and that no ſin, however grievous, would be imputed to the faithful. Aetius likewiſe affirmed, that what God had concealed from the Apoſtles, he had revealed to him.

ÆTIOLOGY, in phyſic, is that branch of the healing art which aſſigns the cauſes of diſeaſes.

The word is Greek, *αιτιολογια*, and compounded of *αιτια*, cauſe, and *λογος*, a diſcourſe.

ÆTITES, the eagle ſtone, in natural hiſtory, a general name for all pebbles or ſtones of any kind, that have a looſe nucleus rattling within.

The work is Greek, *αετιτης*, and derived from *αετος*, an eagle; becauſe the ancients ſuppoſed it was found in the eagle's neſt.

There are a great variety of theſe ſtones; but the moſt valued are thoſe formed from the ſeveral varieties of our pebbles. See plate I. *fig.* 11. which repreſents a ſection of the eagle ſtone, in order to ſhew the cavity and nucleus.

Many virtues have been aſcribed to the ætites by the ancients; but they are all now conſidered as fabulous, and accordingly it has now no place in the materia medica.

AFFECTION, in a general ſenſe, implies an attribute inſeparable from its ſubject. Thus magnitude, figure, weight, &c. are affections of all bodies; and love, fear, hatred, &c. are affections of the mind.

AFFECTION, among phyſicians, ſignifies the ſame as diſeaſe. Thus the hyſteric affection is the ſame with the hyſteric diſeaſe.

AFFEERERS, or AFFEERORS, in law, are perſons appointed in court-leets, courts-baron, &c. to ſettle upon oath the fines proper to be impoſed upon thoſe who have been guilty of faults puniſhable in thoſe courts.

AFFECTUOSO, or *Con* AFFECTO, in the Italian muſic, ſignifies that the part to which it is added, ought to be played in a very tender and moving manner.

AFFIANCE, in law, denotes the mutual plighting of troth between a man and woman, to marry each other.

AFFIDAVIT, in law, ſignifies an oath, in writing, ſworn before ſome perſon properly authoriſed.

The principal uſe of affidavits is to ſatisfy the ſerving proceſſes, or other matters, concerning the proceedings in a court; and ſhould therefore relate only to the matter of fact to be proved, without taking any notice of the merits of the cauſe. But the true place of habitation, and true addition of every perſon who ſhall make an affidavit, muſt be inſerted in it.

AFFINITY, among civilians, implies a relation contracted by marriage; in contradiſtinction to conſanguinity, or relation by blood.

The word is formed from the Latin, *affinitas*, compounded of *ad*, to, and *finis*, boundary; becauſe the limit or boundary of one family approaches to that of another.

AFFINITY, in chemiſtry, implies that natural impulſe or attraction which various bodies exert towards each other.

All the experiments hitherto made, concur with daily obſervation to prove that different bodies, whether principles or compounds, have ſuch a mutual conformity, relation, affinity, or attraction, as diſpoſes ſome of them to join and unite together, while they are incapable of contracting any union with others. This effect, from whatever cauſe it flows, enables the chemiſt to account for, and connect together, all the phænomena that his art produces; and we will endeavour to diſplay the nature of this univerſal affection of matter in the following propoſitions.

Firſt, If one ſubſtance has any affinity or conformity with another, the two will unite together, and form one compound.

Secondly, It may be laid down as a general rule, that all ſimilar ſubſtances have an affinity with each other, and are conſequently diſpoſed to unite; as water with water, earth with earth, &c.

Thirdly, Subſtances that unite together loſe ſome of their ſeparate properties; and the compounds reſulting from their union partake of the properties of thoſe ſubſtances, which ſerve as their principles.

Fourthly, The ſimpler any ſubſtances are, the more perceptible and conſiderable are their affinities: whence it follows, that the leſs bodies are compounded, the more difficult it is to analyſe them; that is, to ſeparate from each other the principles of which they conſiſt.

Fifthly, If a body conſiſt of two ſubſtances, and to this compound be preſented a third ſubſtance that has no affinity at all with one of theſe two primary ſubſtances, but has a greater affinity with the other than thoſe two ſubſtances have with each other, there will enſue a decompoſition, and a new union; that is, the third ſubſtance will ſeparate the two compounding ſubſtances from each other, coaleſce with that which has an affinity with it, form therewith a new combination, and diſengage the other, which will then be left at liberty, and ſuch as it was before it had contracted any union.

Sixthly, It happens ſometimes, that when a third ſubſtance is preſented to a body, conſiſting of two ſubſtances, no decompoſition follows; but the two compounding ſubſtances, without quitting each other, unite with the ſubſtance preſented to them, and form a combination of three principles: and this happens when that third ſubſtance has an equal, or nearly equal, affinity with each of the compounding ſubſtances. The ſame thing may alſo happen, even when the third ſubſtance hath no affinity but with one of the compounding ſubſtances only. To produce ſuch an effect, it is ſufficient that one of the two compounding ſubſtances have, to the third body, a relation equal, or nearly equal, to that which it has to the other compounding ſubſtance with which it is already combined. Thence it follows, that two ſubſtances, which, when apart from all others, are incapable of contracting any union, may be rendered capable of incorporating together, in ſome meaſure, and becoming parts of the ſame compound, by combining them with a third ſubſtance with which each of them has an equal affinity.

Seventhly, A body, which of itſelf cannot decompoſe a compound conſiſting of two ſubſtances, becauſe they have a greater affinity with each other than it has with either of them, becomes nevertheleſs capable of ſeparating the two by uniting with one of them, when it is itſelf combined with another body, having a degree of affinity with that one ſufficient to compenſate its own deficiency: in that caſe there are two affinities; and thence enſues a double decompoſition and a double combination.

Mr. Geoffroy's Table of AFFINITIES *Explained.* See plate VII. *fig.* 1. where this table is exhibited, and the various characters, of which it conſiſts, are explained.

The late Mr. Geoffroy, being convinced of the advantages which all who cultivate chemiſtry would receive from having conſtantly before their eyes a ſtate of the beſt aſcertained relations between the chief agents in chemiſtry, was the firſt who undertook to reduce them into order, and unite them all in one point of view, by means of a table. We are of opinion, with that great man, that this table will be of conſiderable uſe to ſuch as are beginning to ſtudy chemiſtry, in helping them to form a juſt idea of the relations which different ſubſtances have with one another; and that the practical chemiſt will be thereby enabled to account for what paſſes in ſeveral of his operations, otherwiſe difficult to be underſtood, as well as to judge what may be expected to reſult from mixtures of different compounds. Theſe reaſons have induced us to inſert the table itſelf on the copper plate above referred to, and to give a ſhort explanation of it here.

This table apppears in the original form, as drawn up by Mr. Geoffroy himſelf, without any addition or alteration: for though we are perſuaded it might be improved, as many experiments have ſince been made, ſome of which have diſcovered new affinities, and others raiſed exceptions to ſome of thoſe laid down by that chemiſt: yet ſeveral reaſons diſſuade us from publiſhing a new table of affinities, containing all the emendations and innovations that might be made in the old one. And it will be ſufficient here to obſerve, that many of the affinities lately diſcovered are not yet ſufficiently verified; but, on the contrary, ſubject to be conteſted: in ſhort, they are perhaps liable to more conſiderable objections and exceptions than the other.

The upper line of Mr. Geoffroy's table comprehends ſeveral ſubſtances uſed in chemiſtry. Under each of thoſe ſubſtances are ranged, in diſtinct columns, ſeveral matters compared with them, in the order of their relation to that firſt ſubſtance; ſo that the body neareſt to it is that which hath the greateſt affinity with it, or that which none of the ſubſtances ſtanding below it can ſeparate therefrom; but which, on the contrary, ſeparates them all when they are combined with it, and expels them, in order to join itſelf therewith. The ſame is to be underſtood of that which occupies the ſecond place of affinity; that is, it has the ſame property with regard to all below it, yielding only to that which is above it: and ſo of all the reſt.

At the top of the firſt column ſtands the character which denotes an acid in general. Immediately under this ſtands the mark of a fixed alkali, being placed there as the ſubſtance which has the greateſt affinity with an acid. After the fixed alkali appears the volatile alkali, whoſe affinity with acids yields only to the fixed alkali. Next come the abſorbent earths; and, laſt of all, metallic ſubſtances. Hence it follows, that when a fixed alkali is united with an acid, it cannot be ſeparated therefrom by any other ſubſtance; that a volatile alkali, united with an acid, cannot be ſeparated from it by any thing but a fixed alkali; that an abſorbent earth, combined with an acid, may be ſeparated from it either by a fixed or a volatile alkali; and laſtly, that any metallic ſubſtance, combined with an acid, may be ſeparated from it by a fixed alkali, a volatile alkali, or an abſorbent earth.

There are many important remarks to be made on this column. Firſt, it is making the rule too general to ſay, that any acid whatever has a greater affinity with a fixed alkali than with any other ſubſtance: and, indeed, Mr. Geoffroy himſelf hath made an exception with reſpect to the vitriolic acid; for in the fourth column, at the head of which ſtands that acid, we find the ſign of the phlogiſton placed above that of the fixed alkali, as having a greater affinity than the fixed alkali with the vitriolic acid. This is founded on the famous experiment, wherein vitriolated tartar and glauber's ſalt are decompounded by means of the phlogiſton, which ſeparates the fixed alkalis of theſe neutral ſalts, and uniting with the vitriolic acid contained in them, forms therewith a ſulphur.

Secondly, nitre deflagrates, and is decompoſed, by the contact of any inflammable matter whatever that is actually on fire; and the operation which produces phoſphorus is no other than a decompoſition of ſea-ſalt, whoſe acid quits its alkaline baſis to join with the phlogiſton: now theſe facts furniſh very ſtrong reaſons for believing that both theſe acids, as well as the vitriolic, have a ſtronger affinity with the phlogiſton than with a fixed alkali. Laſtly, as ſeveral experiments ſhew the vegetable acids to be only the mineral acids diſguiſed and mortified, there are ſufficient grounds for ſuſpecting that acids in general have a greater affinity with the phlogiſton than with fixed alkalis: ſo that, inſtead of making an exception with regard to the vitriolic acid, it would perhaps be better to lay down this greater affinity as common to all acids whatever, and to place the phlogiſton in the firſt column, immediately under the character which denotes an acid in general. This theory, however, ſhould not be implicitly adopted, till confirmed from other experiments.

Thirdly, in this column, the character of a volatile alkali is ſet above that of an abſorbent earth, as having a greater affinity with acids; and yet theſe abſorbent earths decompoſe the ammoniacal ſalts, drive away the volatile alkali from the acids, and aſſume its place. This is one of the firſt objections made againſt Mr. Geoffroy's table. His anſwer thereto is printed in the

Memoirs of the Academy of Sciences for 1718, where his table alſo may be ſeen. The reader may ſee our opinion of this matter under the article *Volatile* ALKALI.

Fourthly, in 1744, Mr. Geoffroy, brother to the author of the table, preſented a Memoir to the Academy, containing an exception to the laſt affinity in the firſt column; namely, that which places abſorbent earths above metallic ſubſtances. He therein ſhews, that allum may be converted into copperas by boiling it in iron veſſels; that on this occaſion, the iron precipitates the earth of the allum, ſeparates it from its acid, and aſſumes its place; ſo that of courſe it muſt have a greater affinity than the abſorbent earth of allum with the vitriolic acid.

At the head of the ſecond column ſtands the character of the marine acid, which ſignifies that the affinities of this acid are the ſubject of the column. Immediately below it is placed the mark of tin. As this is a metalline ſubſtance, and, as the firſt column places metalline ſubſtances in the loweſt degree of affinity with all acids, it is plain we muſt ſuppoſe fixed alkalis, volatile alkalis, and abſorbent earths, to be placed here in order after the marine acid, and before tin. Tin, then, is of all metalline ſubſtances, that which has the greateſt affinity with the marine acid; and then follow regulus of antimony, copper, ſilver, mercury; gold comes laſt of all; and there are no leſs than two vacant places above it. By this means, it is in ſome ſort excluded from the rank of ſubſtances that have an affinity with the marine acid. The reaſon is, that this acid alone is not capable of diſſolving gold and combining therewith, neceſſarily requiring for that purpoſe, the aſſiſtance of the nitrous acid, or at leaſt of the phlogiſton.

The third column exhibits the affinities of the nitrous acid, the character whereof ſtands at its head. Immediately below it is the ſign of iron, as the metal which has the greateſt affinity with this acid; and then follow other metals, each according to the degree of its relation; namely, copper, lead, mercury, and ſilver. In this column, as in the preceding, we muſt ſuppoſe the ſubſtances, which in the firſt column ſtand above metallic ſubſtances, to be placed in their proper order before iron.

The fourth column is intended to repreſent the affinities of the vitriolic acid. Here Mr. Geoffroy has placed the phlogiſton as the ſubſtance which has the greateſt affinity with this acid, for the reaſon given in our explanation of the firſt column. Below it he has ranked fixed alkalis, volatile alkalis, and abſorbent earths, to ſhew that this is an exception to the firſt column. As to metalline ſubſtances, he has ſet down but three, being thoſe with which the vitriolic acid has the moſt perceptible affinity: theſe metals, placed in the order of their affinities, are iron, copper, and ſilver.

The fifth column ſhews the affinities of abſorbent earths. As theſe earths have no ſenſible affinity but with acids, this column contains only the characters of the acids ranked according to the degree of their ſtrength, or affinity with the earths; namely, the vitriolic, the nitrous, and the marine acids. Underneath the laſt might be placed the acid of vinegar, or the vegetable acid.

The ſixth column expreſſes the affinities of fixed alkalis with acids, which are the ſame with thoſe of abſorbent earths. Here we find ſulphur placed below all the acids; becauſe liver of ſulphur, which is a combination of ſulphur with a fixed alkali, is actually decompounded by any acid: for any acid precipitates the ſulphur and unites with the alkali.

Immediately over the ſulphur, or in the ſame ſquare with it, might be placed a character denoting the volatile ſulphureous ſpirit; becauſe, like ſulphur, it has leſs affinity than any other acid with fixed alkalis. Oils might alſo be ranked with ſulphur, becauſe they unite with fixed alkalis, and therewith form ſoaps, which are decompounded by any acid whatever.

The ſeventh column points out the affinities of volatile alkalis, which are likewiſe the ſame as thoſe of abſorbent earths; and the vegetable acid might be placed here alſo under the marine acid.

The eighth column ſpecifies the affinities of metallic ſubſtances with acids. The affinities of the acids, which with reſpect to fixed alkalis, volatile alkalis, and abſorbent earths, ſucceeded each other uniformly, do not happen in the ſame order here. The marine acid, inſtead of being placed below the vitriolic and nitrous acids, ſtands, on the contrary, at their head; becauſe, in fact, this acid ſeparates metalline ſubſtances from all the other acids with which they happen to be united, and forcing theſe acids to quit poſſeſſion, intrudes into their places. This is not however a general rule; for ſeveral metalline ſubſtances muſt be excepted, particularly iron and copper.

The ninth column declares the affinities of ſulphur; fixed alkalis, iron, copper, lead, ſilver, regulus of antimony, mercury, and gold, ſtand below it in the order of the affinities. With regard to gold, it muſt be obſerved, that it will not unite with pure ſulphur; it ſuffers itſelf to be diſſolved only by the liver of ſulphur, which is known to be a compoſition of ſulphur and fixed alkali.

At the head of the tenth column appears mercury, and beneath it ſeveral metalline ſubſtances, in the order of their affinities with it. Theſe metalline ſubſtances are gold, ſilver, lead, copper, zinc, and regulus of antimony.

It is proper to remark on this column, that regulus of antimony, which ſtands the loweſt, unites but very imperfectly with mercury; and that after a ſeeming union of theſe two metallic ſubſtances hath been obtained, by a tedious trituration with the addition of water, they do not continue long united, but ſpontaneouſly ſeparate from each other in a ſhort time. Iron and tin are here excluded; the former with great reaſon, becauſe hitherto it hath not been clearly proved, by any known experiment, that ever mercury was united with iron; but the ſame objection cannot be made to tin, which amalgamates very well with mercury, and might therefore be placed in this column nearly between lead and copper. We uſe the word nearly, becauſe the different degrees of affinity between metalline ſubſtances and mercury are not ſo exactly determined, as the other relations before conſidered; for they generally unite with it, without excluding one another. We can therefore ſcarce judge of the degree of affinity that belongs to each, but by the greater or leſs readineſs of each to amalgamate therewith.

The eleventh column ſhews, that lead has a greater affinity with ſilver than with copper.

The twelfth, that copper has a greater affinity with mercury than with calamine.

The thirteenth, that ſilver has a greater affinity with lead than with copper.

The fourteenth contains the affinities of iron. Regulus of antimony ſtands immediately underneath it, as being the metallic ſubſtance which has the greateſt affinity with it. Silver, copper, and lead, are placed together in the next ſquare below, becauſe the degrees of affinity which thoſe metals have with iron, are not exactly determined.

The ſame may be obſerved of the fifteenth column: regulus of antimony ſtands at its head; iron is immediately below it; and below the iron, the ſame three metals occupy one ſquare, as before.

Laſtly, the ſixteenth column indicates, that water has a greater affinity with ſpirit of wine than with ſalts. By this general expreſſion muſt not be underſtood any ſaline ſubſtance whatever; but only the neutral ſalts, which ſpirit of wine frees from the water that kept them in ſolution. Fixed alkalis, on the contrary, as well as the mineral acids, have a greater affinity than ſpirit of wine with water; ſo that theſe ſaline ſubſtances, being well dephlegmated and mixed with ſpirit of wine, imbibe the water it contains, and rectify it.

To theſe might be added another ſhort column, having ſpirit of wine at its head; immediately below it ſhould be the character of water; and below that, the mark of oil. This column would ſhew, that ſpirit of wine has a greater affinity with water than with oils; becauſe any oily matter whatever, diſſolved in ſpirit of wine, may be actually ſeparated from it by the effuſion of water. This rule admits of only one imperfect exception, which is, when the oily ſubſtance partakes of the nature of ſoap, by having contracted an union with ſome ſaline matter. But as this muſt be imputed wholly to that adventitious ſaline matter being ſuperadded to the oily ſubſtance, it is no juſt foundation for an exception; and the affinity in queſtion is therefore general.

AFFIRMATION, in a general ſenſe, implies a ſolemn atteſtation of the truth of ſome fact.

Affirmation, among logicians, ſignifies an act of the mind, aſſerting the truth or reality of ſomething; or a poſitive propoſition declaring certain properties or qualities to belong to the thing in queſtion.

Affirmation, in law, denotes an indulgence allowed to the people called Quakers, who, in caſes where an oath is required from others, may make a ſolemn affirmation that what they ſay is true; and if they make a falſe affirmation, they are ſubject to the penalties of perjury. But this relates only to oaths taken to the government, and on public occaſions; for Quakers are not permitted to give their teſtimony in any criminal caſe, &c.

AFFIRMATIVE, in a general ſenſe, denotes any thing that implies an affirmation.

Affirmative *Propoſition.* See the article Proposition.

Affirmative *Quantity.* See Quantity.

Affirmative *Sign*, in algebra, is marked thus +. See Character.

The affirmative ſign before and between two or more numbers, quantities, or literal expreſſions, implies their ſum, addition, or aggregate, ſtanding inſtead of the words *more*, *plus*, or added to, and commodiouſly aſſiſting the imagination; as + 5, + 7, or *plus* 5, *plus* 7, or *more* 5, *more* 7, or 5 *added to* 7, ſignifies the ſum of 5 and 7, viz. 12; ſo alſo $+ a$, $+ b$, or *plus* a, *plus* b, or *more* a, *more* b, or a *added to* b, is the ſum of a and b. So alſo the lines + AB + CD + EF, ſignifies the ſum or aggregate of the lines AB, CD, and EF; that is, theſe lines put together.

AFFIX, among grammarians, implies a particle added to the end of a word.

AFFORESTING, in our old law books, ſignifies the turning lands into a foreſt.

AFFRAY, in law, formerly ſignified the crime of affrighting, or terrifying; but at preſent denotes a fight or ſkirmiſh between two or more perſons.

The word is derived from the French, *affrayer*, to affright.

AFFREIGHTMENT, a term uſed in ſome law books, for the freight or hire of a ſhip.

AFFRONTEE, in heraldry, is an appellation given to animals facing one another.

AFRICA, in geography, is a vaſt peninſula, forming one of the four quarters, or diviſions, of the world. It is joined to Aſia by the iſthmus of Suez, whilſt the Red-ſea and Eaſtern-ocean bound it on the eaſt. On the north it is bounded by the Mediterranean; on the ſouth by the Southern ocean; and on the weſt by the Atlantic ocean. It is about 6072 miles in length from north to ſouth, and 420 in breadth from eaſt to weſt. The principal commodities of this large diviſion of the earth, are gold duſt, ambergriſe, elephants teeth, guinea-pepper, red-wood, hides, wax, ſaunders, ſugar, civet, oil, cardamums, hemp, flax, dates, almonds, indigo, gum, oſtrich feathers, amber, ebony, canes, citrons, lemons, oranges, copper, cocoa-nuts, ſaffron, cryſtal, and many other particulars, beſides ſlaves, with whom the American plantations of all the European powers are ſupplied.

Africa is repreſented, in painting, by a black woman almoſt naked, with frizzled, wooly hair, an elephant's trunk for a creſt, a lion on one ſide, and a ſerpent on the other; decorated with other emblems relating to the produce of the country.

AFT, in the ſea language, ſignifies the ſame with abaft. See Abaft.

AFTER-BIRTH, in midwifery, ſignifies the membranes which ſurround the infant in the womb, generally called the ſecundines. See the article Delivery.

After-math, in huſbandry, denotes the graſs which ſprings up after mowing; or the graſs cut after the corn.

After-pains, in midwifery, exceſſive pains felt in the groin, loins, &c. after the woman is delivered.

After-swarms, in the management of bees, are thoſe which leave the hive ſome time after the firſt have ſwarmed.

AGA, among the Turks, ſignifies a great lord or commander. They ſometimes uſe the word agaſſi, or agaſi, inſtead of aga. Thus they call the aga, or commandant general of the cavalry, ſpahilar agaſſi.

AGALLOCHUM, in natural hiſtory, the name by which the lignum-aloes, or xylo-aloes, was known among the ancient Greeks. See Lignum-aloes.

AGALMATA, in antiquity, a term originally uſed to ſignify any kind of ornaments in a temple; but afterwards for the ſtatues only, as being moſt conſpicuous.

AGANIPPIDES, an appellation given to the muſes from a fountain on mount Helicon called Aganippe.

AGAPE, in eccleſiaſtical hiſtory, the love-feaſt, or feaſt of charity, in uſe among the primitive Chriſtians, when a liberal contribution was made by the rich to feed the poor.

The word is Greek, and ſignifies love.

St. Chryſoſtom gives the following account of this feaſt, which he derives from the apoſtolical practice. He ſays, the firſt Chriſtians had all things in common, as we read in the Acts of the Apoſtles; but when that equality of poſſeſſions ceaſed, as it did even in the Apoſtles time, the agape, or love-feaſt, was ſubſtituted in the room of it. Upon certain days, after partaking of the Lord's Supper, they met at a common feaſt; the rich bringing proviſions, and the poor, who had nothing, being invited.

It was always attended with receiving the Holy Sacrament; but there is ſome difference between the ancient and modern interpreters as to the circumſtance of time; viz. Whether this feaſt was held before, or after, the communion. St. Chryſoſtom is of the latter opinion; the learned Dr. Cave of the former.

The agapæ, or love-feaſts, during the three firſt centuries, were held in the church: but at length ſuch abuſes were committed at them, that the councils of Laodicea and Carthage prohibited that practice for the future.

AGAPETÆ, in eccleſiaſtical hiſtory, young maidens, who frequented the company of eccleſiaſtics from a motive of piety and charity. But this cuſtom afterwards degenerating into libertiniſm, the agapetæ became a term of reproach.

The word is Greek, and ſignifies well-beloved. It is derived from αγαπαω, to love.

AGARIC, in natural hiſtory, a ſpongy fungous ſubſtance, growing on the trunk of a tree, or, in the language of the ancients, an excreſcence or apoſtem from age or diſeaſe. See plate I. *fig.* 13.

The tree that produces the agaric is the common larch, from which turpentine is obtained. It grows wild in Dauphiny, Savoy, on the Alps, in Auſtria, Tartary, &c. and is the only coniferous tree that ſheds its leaves in the winter: when it grows old, the fungus comes forth in ſeveral places on its trunk, and if the tree is large, on the firſt branches.

The fungus is of various ſizes, ſometimes not exceeding the bigneſs of the fiſt, ſometimes as large as a man's head: it takes at leaſt a year to grow to its full ſize. There are two kinds of it, called by the ancients *mas* and *femina*. The male agaric is dark-coloured, hard, heavy, and woody: it is ſeldom taken from the larch, but chiefly from old oak trees, and hence is called by ſome agaric of the oak: it is quite unfit for any medicinal uſe, and is only now and then employed by the dyers as an ingredient in the black dye. The female, or officinal agaric, is covered with a hard blackiſh rind like the other; but when the cortical part is pared off, the internal ſubſtance appears quite white: by age, it changes a little yellowiſh. It ſhould be very light, porous, eaſy to break, free from any hard pieces, or compact veins. Taſted, it proves at firſt ſweetiſh, but preſently becomes very bitter and nauſeous.

As agaric is an excreſcence from a very reſinous tree, it is natural for it to be rich in reſin. We find in effect that it contains three fourths of its weight in reſinous matter, and that the remaining fourth is a ſlimy, mucilaginous earthy ſubſtance, ſo tenacious as ſcarce to be by any means diſſolved or divided: continuing, however, treated with water, a tough gluey paſte. The purgative quality of agaric reſides in the reſin: to the glutinous matter we may attribute the dangerous conſequences, which, when given in ſubſtance, however corrected, it is apt to produce. No wonder that ſuch a coheſive indiſſoluble ſubſtance ſhould adhere pertinaciouſly to the ſtomach and inteſtines, and occaſion gripes and other inconveniencies.

From eight ounces of very good agaric, I obtained, by rectified ſpirit, ſix ounces of reſinous extract; from the reſiduum only two drams and two ſcruples of watry extract; the indiſſoluble tenacious matter weighed two ounces one dram and a half: ſo that there was, upon the whole, an increaſe of near half an ounce above the original weight of the agaric, from a part of the menſtrua retained. On applying water, at firſt I got but bare three drams of extract; on treating the remainder with ſpirit, I gained near as much reſin as when the ſpirit was uſed at firſt, namely, five ounces and ſeven drams; the indiſſoluble matter weighed, when dry, two ounces and two drams.

In reducing agaric to powder, whether by the raſp or the peſtle, great care muſt be taken to avoid the fine duſt that flies off, which is not only apt to occaſion violent ſneezing and inflammations of the eyes, but is likewiſe very prejudicial to the breaſt. Agaric cannot of itſelf be pulverized in a mortar, on account of its glutinous ſubſtance: the beſt way of obtaining a powder from it is, firſt to raſp, and then make it into a paſte with mucilage of gum tragacanth; when this is thoroughly dry, great part of it may be beat into a fine powder, and by treating the remainder in the ſame manner, the whole will at length be got through a ſieve. It might be ſuppoſed, that as it is the mucilaginous part of agaric itſelf that prevents its pulverization, the addition of freſh mucilage would do more harm than good; but the mucilage of gum tragacanth is of a quite different nature from that of agaric, being ſoluble, harmleſs, when dry brittle, and rendering the agaric alſo pulverable. In ſome diſpenſatories, a reſinous extract is directed to be prepared from this fungus, by rectified ſpirit. *Neumann's Chemiſtry.*

The agaric of the oak has been lately recommended as an external ſtyptic; and has been even ſaid to prevent hæmorrhages after amputation, as effectually as the painful operation of the needle. To render the agaric fit for this application, the internal ſoft part of the fungus muſt be divided into pieces of different ſizes, and beaten with a hammer till it may be eaſily torn with the fingers. In this condition it is to be applied to the orifices of the veſſels, and covered with the uſual dreſſings. In a ſhort time the extremities of the veſſels are ſaid to be found contracted into a conical ſhape, and the orifices ſtopt with plugs of coagulated blood, ſufficient to reſiſt the force of the circulation. Caſes have been publiſhed, in which this application ſeemed to anſwer the above character; and others, in which it proved ineffectual: ſo that the agaric has loſt great part of its repute.

Nor does it ſeem to be poſſeſſed of any conſiderable degree of ſtyptic power. Perhaps it only acts as a ſoft pliable ſubſtance, adhering to the orifices of the veſſels, till they have contracted ſpontaneouſly. This will appear the more probable, when we remember, that other fungi have formerly been uſed in the ſame intention; and that there are late accounts in the Philoſophical Tranſactions of two different ſpecies which have been uſed with ſucceſs; namely, the lycoperdon, or duſty muſhroom, and that found on caſks, and the walls of wine-vaults, called fungus vinoſus.

Mineral AGARIC, in natural hiſtory, a light marley earth, ſo called from its reſembling, both in colour and its ſpongy texture, the vegetable agaric. Some have recommended it in fluxes, hæmorrhages, and to dry up old ulcers; but it is very rarely, if ever, uſed at preſent.

AGARICOIDES, in botany, a ſort of ſmall white fungus, with yellowiſh lamellæ, found frequently in the woods on the bark of old trees.

The word is compounded of the Greek, *αγαρικον*, agaric, and *ειδος*, reſemblance.

AGATE, in natural hiſtory, a precious ſtone reſembling the onyx, with regard to colour: but has no zones like thoſe wherewith the onyx is decorated: inſtead of thoſe, the agate has lines or ſpots of various colours, diſpoſed in ſuch a manner as to repreſent the pictures of different objects; as woods, rivers, fruits, flowers, herbs, and clouds, though not very diſtinctly.

Boet tells us, that he had himſelf an agate which, tho' no bigger than the finger-nail of a man, was marked with a perfect circle, within which was the figure of a biſhop, with a mitre on his head.

The agate differs from the jaſper in hardneſs and ſmoothneſs; for though the jaſper has the ſame colours, it is ſofter, and conſiſts of rougher particles.

The white veined agate, with delineations of trees and moſſes, is moſt commonly known by the name of the Mocha ſtone. It is of a very firm compact, and fine texture, though found in the ſhape of a flinty pebble ſtone. The ſizes are various, being ſometimes only one, and ſometimes eight inches in diameter. The veins of this ſtone are very beautifully diſpoſed in different figures; but there are generally many concentric irregular circles, deſcribed from centers placed in various places. They are commonly a little whiter than the ground, though ſometimes ſo faint as ſcarcely to be ſeen. Thoſe of this kind are of the higheſt value, and contain the figures of trees, moſſes, ſea-plants, and the like. Some have ſuppoſed that theſe ſtones are only petrifications; and that real moſſes and ſea-plants were included therein: but this is evidently a miſtake; for the real objects which they repreſent were never met with in ſo diminutive a ſize as their images repreſented in theſe ſtones. No one ſurely can ſeriouſly imagine that there ever was a perfect tree no more than half an inch high. Theſe figures are generally black, or of a duſky colour, and appear with great advantage from the whiteneſs of the ſtone. This kind of agate, when it is perfect, is only found in the Eaſt Indies; but there are ſome of an inferior ſort to be met with in Germany. They are called Mocha ſtones, becauſe they have been brought from the Eaſt Indies to Mocha in Arabia, and thence tranſported into Europe. There are, however, ſome naturaliſts who will not allow them to be found in the Eaſt Indies. If this be true, they may be found near the place to which they owe their name; or perhaps be brought to Mocha from other parts of Arabia, or even Africa.

The dull milky agate is not ſo valuable as the former, though of a very firm texture. They are found in the ſhape of common flint ſtones, and are from one inch to ten in diameter. It is of the colour of milk, or rather like that of cream; and, when broken, has a ſmooth gloſſy ſurface. It is more opaque than the former, and yet will bear a very fine poliſh. This ſpecies is common on the ſhores of the rivers in the Eaſt Indies; and there are ſome of leſs value met with in Germany and Bohemia. This ſpecies of agate was in far more eſteem formerly than at preſent, becauſe it is now very common.

The lead-coloured agate, with black and white veins, is, by Boet, called the phaſſachates; and is of a very fine, firm, compact texture; though found, like the former, in the ſhape of common flint ſtones, and of as rugged a ſurface. The ground is of a pale bluiſh grey, or rather of a dove-colour; and often without variation, though it has ſometimes black and ſometimes white veins, which are generally near the centre of the ſtone. This ſpecies of agate greatly reſembles an onyx, but is certainly a diſtinct ſtone. It is very hard, and will bear a fine poliſh. It is found in the Eaſt Indies, as well as in Germany; where they form theſe ſtones into cups and ſnuff-boxes.

The fleſh-coloured agate is not ſo valuable as any of the former, though its texture is pretty firm and compact; and its diameter from one to ten inches. The fleſh-colour is very faint, and almoſt whitiſh; but never entirely wanting. Some of theſe ſtones have no veins at all, and others abound in veins, ſpots, or clouds. The ſpots are generally very ſmall, about the ſize of a pin's head, notched at the edges; though ſometimes much leſs. When broken in pieces, it is very ſmooth and gloſſy, though not always of the ſame tranſparency. It is found in Germany, Bohemia, and Italy; and is worked into various ſorts of veſſels: it is alſo often made uſe of inſtead of gun-flints.

The blood-coloured agate is, by Boet, called the hæmachates, and excels moſt of this claſs in beauty. It is always of a deep blood-red colour, ſometimes throughout, but more frequently variegated with a pale blue and brown. The blue always ſurrounds the red, and inclines to the colour of whey; but it is in no other part of the ſtone. The brown is of the colour of horn, and generally appears in irregular veins, ſometimes in ſuch plenty as to make the ground to the ſtone, and the red with its blue edges only the variegation. This ſpecies is not very common, though found in the Eaſt Indies, America, and ſome parts of Germany. It is chiefly uſed for the tops of ſnuff-boxes.

The clouded and ſpotted fleſh-coloured agate is, by Boet, called the ſandachates, and is of a very fine cloſe texture, though ſubject to flaws and cracks when the pieces are large; for which reaſon the leſſer ſtones are moſt eſteemed. It differs from the former ſpecies in having a ſmoother ſurface; and is generally of a roundiſh or oblong ſhape, a little flatted. It has no variegations except a few exceeding ſmall ſpots, of a beautiful red, variouſly diſpoſed in different parts of the ſtone, and in different groupes. In ſome places it is more tranſparent than others; and is found in the Eaſt and Weſt Indies, as alſo in Bohemia and Sileſia, though not ſo good. It is, however, very little eſteemed at preſent.

The red agate, variegated with yellow, is of the colour of red lead, has a fine pure equal texture, with a ſmooth regular ſurface, and is commonly found in the ſhape of a pebble ſtone. It is from one inch to four or five in diameter, and its ground of a paler red, decorated with one of a deeper colour, diſpoſed in concentric veins from different centers; but this does not appear without cloſe examination. Beſides theſe, it has irregular bright yellow ſpots, which are never interſected by the veins, but placed either within or without theſe circles; and always extremely ſhort, being never above a ſixth part of an inch in length. This ſtone is very hard, and will bear a very fine poliſh. It is found in the Eaſt Indies, though not very common.

The yellow agate, named, by Boet, the cerachates, or the wax-coloured agate, has been found from one to ſeven inches in diameter, of various ſhapes and ſizes, but all of a very firm compact texture. Theſe ſtones are ſometimes of the ſame colour throughout; ſometimes mixed with irregular veins; and ſometimes of a pale and almoſt white ground, veined and ſpotted with a ſtrong yellow, exactly reſembling that of fine yellow bees-wax. They are all very hard and capable of a fine poliſh; but differ greatly in degrees of tranſparency; for ſome are as tranſparent as any of the ſpecies of agate, and others almoſt entirely opaque. Theſe ſtones are found in the Eaſt Indies and America, as alſo in Germany, though not very good.

The pale yellow agate, variegated with white, black, and green, is called, by Boet, the leonina, from its likeneſs to a lion's ſkin, and by the Italians brocatella. It is more variegated than the reſt of the ſtones of this kind, and has a fine compact cloſe texture, though in very irregular ſhapes, with a rugged ſurface. It ſometimes ſeems to conſiſt of an irregular maſs, made up of the abovementioned colours; ſometimes diſtinctly clouded, and ſometimes decorated with black and green veins in the form of concentric circles round a centre. The ground is always of a pale yellow, but very differently diſpoſed; ſometimes more, ſometimes leſs. In ſome alſo, one or more of theſe colours are wanting, while others contain them all. The green reſembles that of the jaſper, and the black inclines a little to the brown. It breaks with ſome difficulty into pieces, with fine ſmooth ſurfaces, and is brought from the Eaſt Indies; but, being very ſcarce, is not commonly known.

The blackiſh veined brown agate has, when found, a pretty ſmooth ſurface, though of an irregular ſhape, and is from two to ſeven inches in diameter. The brown is pretty deep, and finely clouded, ſpotted, and veined with a colour almoſt black, while the veins are generally paler and browner than the other variegations. The veins are diſpoſed in irregular concentric circles, and the innermoſt generally broadeſt. There have ſometimes been vegetable ſubſtances found in the middle of this ſtone, ſuch as the ſlender roots of moſs, or thoſe of crow ſilk. It is capable of a very high and beautiful poliſh; and is commonly cut into ſeals, buttons, heads of canes, knife-handles, and the tops of ſnuff-boxes. It is frequently adorned with fictitious colours, which ſink ſo deep into the ſubſtance, that they appear like the natural veins of the ſtone, and render it of great value.

The greeniſh brown variegated agate ſeems to be of a middle nature, between agate and jaſper. It is a beautiful ſpecies, and found in roundiſh maſſes, with a ſmooth, even ſurface, from two to ſix inches in diameter. Its texture is very firm, and the ſtone ſometimes of the ſame colour throughout, being only diſtinguiſhable from the true jaſper by its hardneſs. But it has moſt frequently a browniſh green ground, variegated with irregular concentric circles, of a red or a finer green; it is alſo found irregularly clouded and ſpotted with the ſame or other colours, as white, fleſh-colour, and yellow. It is never entirely tranſparent in thoſe that are cleareſt; and is found in different parts of the world, but not equally good; for the European are the worſt, they being more coarſe, ſoft, and opaque, than thoſe of the Eaſt or Weſt Indies. *Brookes's Natural Hiſt.*

Agate is alſo the name of an inſtrument uſed by gold wire-drawers; ſo called from the agate in the middle of it, which forms its principal part.

AGATY, in botany, the name of a genus of trees growing in Malabar, about twenty-four feet in height, and the trunk ſix feet in circumference. The agaty bears papilionaceous and ſcentleſs flowers, which are ſucceeded by pods three feet in length, and half an inch in breadth, containing ſeeds reſembling our kidney beans, which the natives eat with their food.

AGE, in a general ſenſe, denotes a certain portion, or part of duration, applied to ſome particular object. Thus we ſay the age of the world, or the years that have elapſed ſince the creation.

Ages *of the World.* The greater part of hiſtorians and chronologers have divided the age of the world into ſix principal epochas; but are not agreed between themſelves with regard to the number of years contained in each interval. Thoſe who place the creation ſix thouſand years before the birth of Chriſt, make the interval between the creation and the deluge to conſiſt of 2262 years; from the deluge to the call of Abraham, 1198, from the call of Abraham to the inſtitution of the Paſſover, 645; from the inſtitution of the Paſſover to the beginning of the reign of Saul, 774; from Saul to the publiſhing of the decree of Cyrus, for the return of the Jews, 583; and from the decree of Cyrus to the birth of Chriſt, 538.

Thoſe who make the age of the world at the birth of Chriſt only four thouſand years, follow the chronology of the Hebrew text, and compute from the creation to the deluge, 1656 years; from the deluge to the call of Abraham, 426; from the call of Abraham to the exodus, or going out of Egypt, 430; from the exodus to the foundation of the temple, 480; from the foundation of the temple to Cyrus, 476; and from Cyrus to the birth of Chriſt, 532.

Others compute from the creation to the taking of Troy, 2830 years; from the taking of Troy to the foundation of Rome, 420; from the foundation of Rome to the deſtruction of Carthage by Scipio, 602; from the deſtruction of Carthage to the birth of Chriſt, 200; from the birth of Chriſt to Conſtantine, 312; and thence to the re-eſtabliſhment of the weſtern empire, 808. So that the interval, according to theſe chronologers, between the creation and the birth of Chriſt, is 4052 years.

To theſe computations of the ages of the world, we ſhall add another, from the learned Mr. Jackſon's Chronological Antiquities, who has carefully inveſtigated the different epochas, and ſhewn the reaſons on which his computations are founded. From the creation to the deluge, 2262 years; from the deluge to the birth of Abraham, 1072; from the birth of Abraham to the exodus, 505; from the exodus to the foundation of the temple, 579; from the foundation to the deſtruction of the temple by Nebuchadnezzar, 428; from the deſtruction of the temple to the decree of Cyrus, 51; and from the decree of Cyrus to the birth of Chriſt, 535. So that the interval between the creation and the birth of our bleſſed Saviour, conſiſts of 5432 years.

Some divide the duration of the world into three periods, which they call the age of the law of nature; the age of the Jewiſh law; and the age of grace. The firſt comprehends the time between Adam and Moſes; the ſecond the time between that lawgiver and Chriſt; and the third the years elapſed ſince the birth of our bleſſed Saviour.

The ancient hiſtorians divided the time elapſed ſince the beginning of the world into three periods, which they called ages. The firſt reaches from the creation to the deluge which happened in Greece during the reign of Ogyges: this they ſtiled the obſcure or uncertain age; becauſe the hiſtory of mankind is altogether uncertain during that period. The ſecond they named the fabulous, or heroic age; becauſe it is the period in which the fabulous accounts of their gods and heroes are ſaid to have been performed: it began at the Ogygian deluge, and extended to the firſt Olympiad; where, what they called, the hiſtorical age commenced.

AGE, among hiſtorians, is alſo often uſed to ſignify a century.

Poetical AGES *of the World*. The poets have divided the interval ſince the formation of man into four ages, which they have diſtinguiſhed by the epithets of *golden*, *ſilver*, *brazen*, and *iron*. During the *golden age*, Saturn reigned in Heaven, and juſtice and innocence in this lower world. The earth then yielded her productions without culture, and ſtreams of milk and honey flowed in every part. The *ſilver age* commenced when men began to deviate from the paths of virtue; and, in conſequence of this deviation, their lives were rendered leſs happy. The *brazen age* began when the virtue and happineſs of men were ſtill more diminiſhed; and this gave place to the *iron age*, which commenced when men had deviated ſtill farther from the paths of virtue and happineſs. Such is the ſyſtem which Heſiod, in his treatiſe intitled *Works and Days*, has given more at large; and where the poet has repreſented, in a very inſtructive allegory, the melancholy conſequences which always flow from injuſtice.

AGE alſo denotes a certain degree or period of human life, which is generally divided into four ſtages; namely, infancy, youth, manhood, and old age. The firſt extends to the fourteenth year; the ſecond to the twenty-fifth year; the third to the fiftieth year; and the fourth to the end of life.

AGE, in law, ſignifies certain periods of human life, when perſons of either ſex are enabled to do certain acts, which, for want of years and diſcretion, they are incapable of before. Thus a youth of twelve years of age may take the oath of allegiance; at fourteen, he may chooſe his guardian and claim his lands held in ſoccage. Twenty-one is called full age, a man or woman being then capable of acting for themſelves, and of managing their own affairs.

AGE *of a Tree*, ſignifies the time elapſed between its being planted and cut down.

The age of a tree may be known by the ligneous circles viſible in its trunk, divided horizontally by a ſaw: for both the trunk and branches of a tree acquire annually an augmentation of a ligneous circle, or a new exterior texture of fibres.

AGE *of a Horſe*, implies the time elapſed ſince the animal was foaled.

This is eaſily known by his mouth till he is eight years old, when the marks wear out. A horſe, like many other creatures of the brute-creation, has his teeth divided into three ranks; his fore-teeth, which are flat and ſmooth; his tuſhes; and his back teeth, called alſo his jaw-teeth, or grinders, becauſe with theſe he grinds his provender. They are twenty-four in number, twelve above, and twelve below; ſtrong and double, with ſharp edges, till the creature grows old, when they are worn much ſmoother.

The firſt that grow are his foal-teeth, which begin to appear a few months after he is foaled. They are twelve in number, ſix above and ſix below; and are eaſily diſtinguiſhed from the teeth that come up afterwards, by their ſmallneſs and whiteneſs, not unlike the fore-teeth of a man.

When a colt is about two years and a half old, he caſts the four middlemoſt of his foal-teeth, viz. two above and two below; though ſome do not caſt their foal-teeth till near three years old. The new teeth are eaſily diſtinguiſhed from the foal-teeth, being much ſtronger, and almoſt twice their ſize, and are called the nippers or gatherers, being thoſe by which the creature nips off the graſs when he is feeding abroad in the fields, or, when, in the houſe, gathers his hay from the rack. When a horſe has got theſe four teeth complete, he is reckoned four years old.

When he is about three and a half, or in the ſpring before he is four years old, he caſts four more of his foal-teeth, viz. two above and two below, one on each ſide of the nippers, or middle teeth. When, therefore, you look in a horſe's mouth, and ſee the four middle teeth full grown, and none of the fore-teeth remaining, except the corner teeth, you may conclude he is four years old about April or May: ſome, indeed, are later colts; but this makes but little difference in the mouth.

The tuſhes appear about the ſame time with the laſt-mentioned teeth, ſometimes ſooner than theſe, and ſometimes not till a horſe is full four years old. They are curved like the tuſhes of other beaſts; but in a young horſe they have a ſharp edge all round the top, and on both ſides, the inſide being ſomewhat grooved and flattiſh, inclined to a hollowneſs.

When horſes tuſhes do not appear till ſome time after the foal-teeth are caſt, and new ones are come in their room, it is generally owing to the foal-teeth having been pulled out before their time by the breeders or other dealers in horſes, in order to make a colt of three years old appear like one of four, that he may be the more ſaleable; for when any of the foal-teeth are pulled out, the others ſoon come in their place; but the tuſhes, having none to precede them, cannot make their appearance before their proper time, viz. when a horſe is nearly four years old. One of the ſureſt marks therefore to know a four-year old horſe, is by his tuſhes, which are then but very ſmall, and ſharp on the top and edges.

When a horſe comes five, or rather the ſpring before he is five, the corner teeth begin to appear, and are at firſt but juſt equal with the gums, being filled with fleſh in the middle. The tuſhes are alſo by this time grown to a more diſtinct ſize, though not very large; they alſo continue rough and ſharp on the top and edges. But the corner teeth are now moſt to be remarked: they differ from the middle teeth in being more fleſhy on the inſide, and the gums generally look rawiſh on their firſt ſhooting out; whereas the others do not look diſcoloured.

The middle teeth arrive at their full growth in leſs than three weeks; but the corner teeth grow leiſurely, and are ſeldom much above the gums till the horſe is full five: they differ alſo from the other fore-teeth, in reſembling, in ſome meaſure, a ſhell; and thence are called the ſhell-teeth; becauſe they environ the fleſh in the middle half-way round, and, as they grow, the fleſh within diſappears, leaving a diſtinct hollowneſs and openneſs on the inſide. When a horſe is full five, theſe teeth are generally about the thickneſs of a crown piece above the gums. From five to five and a half, they grow about a quarter of an inch high; and when a horſe is full ſix, they will be near half an inch above the gums.

The corner teeth in the upper jaw fall out before thoſe of the under; ſo that the upper corner teeth are ſeen before thoſe below: on the contrary, the tuſhes in the under jaw come out before thoſe of the upper.

When a horſe is full ſix years old, the hollowneſs on the inſide begins viſibly to fill up, and that which was at firſt fleſhy, grows into a browniſh ſpot, not unlike the eye of a dried garden-bean, and continues ſo till he is ſeven, with only this difference, that the tooth is more filled up and even, and the mark or ſpot becomes faint, and of a lighter colour. At eight the mark in moſt horſes is quite worn out, though ſome retain the veſtiges of it for a long time; and thoſe who have not had a good deal of experience may ſometimes be deceived, and take a horſe of nine or ten years old for one of eight. It is only at this time, when a horſe is paſt mark, that we can eaſily err in knowing the age of a horſe; for whatever practices are uſed to make a young horſe look older than he really is, by pulling out the foal-teeth before their time, may be diſcovered by feeling along the edges where the tuſhes grow, as they may be felt in the gums before the corner teeth appear; whereas, if the corner teeth become viſible ſome months before the tuſhes riſe in the gums, there is reaſon to ſuſpect that the foal-teeth have been pulled out at three years old.

It will be unneceſſary to take particular notice of the tricks uſed by dealers, in order to make a falſe mark in a horſe's mouth, by hollowing the tooth with a graver, and burning a mark with a ſmall hot iron; becauſe thoſe who are acquainted with the true marks, will eaſily diſcover the cheat by the ſize and colour of the teeth, by the roundneſs and bluntneſs of the tuſhes, by the colour of the falſe mark, which is generally blacker and more impreſſed than the true mark, and by many other viſible tokens which denote the advanced age of a horſe. *Gibſon's Treatiſe on Horſes.*

AGE *of the Moon*, in aſtronomy, is the number of days elapſed ſince the laſt new moon: to find which, add together the epact, the day of the current month, and the number for the month; the ſum, if it exceeds not 29, is the age of the moon; but if it be more, deduct 29 from it in months which have but 30 days, and 30 in thoſe which have 31 days, the remainder will be the moon's age. See EPACT.

The number to be added for each month is as follows: for January 0, February 2, March 1, April 2, May 3, June 4, July 5, Auguſt 6, September 8, October 8, November 10, and December 10.

At the end of 19 years, the moon's age returns upon the ſame day of the month, but falls ſhort of the preciſe time of the day.

AGEMOGLANS, AGIAMOGLANS, or AZAMOGLANS, in the Turkiſh polity, are children purchaſed from the Tartars, or raiſed every third year, by way of tribute, from the Chriſtians tolerated in the Turkiſh empire.

The word, in the original, ſignifies a *barbarian's child*, or, according to the notion of the Muſſulmans, one whoſe parents are not Turks; and is compounded of two Arabic words, *agem*, barbarian, and *oglan*, a child.

Theſe, after being circumciſed, and inſtructed in the religion and language of their tyrannical maſters, are learnt the exerciſes of war, till they are of a proper age for carrying arms: and from this corps the janiſſaries are recruited. With regard to thoſe who are thought unfit for the army, they are employed in the loweſt offices of the ſeraglio. Their appointments alſo are very ſmall, not exceeding ſeven aſpres and a half per day, which amount to about three-pence halfpenny of our money.

AGENDA, among philoſophers and divines, ſignifies the duties which a man is obliged to perform.

The word is Latin, and derived from *ago*, to perform.

AGENDA, among merchants, implies a memorandum book, in which all the buſineſs to be tranſacted, both at home and abroad, is ſet down.

AGENORIA, in mythology, the goddeſs of courage and induſtry. She was oppoſed to Vacuna, the goddeſs of indolence.

AGENT, in a general ſenſe, implies any thing that acts and produces an effect.

The word is Latin, *agens*, and derived from *ago*, to perform.

AGENT, in mechanics and philoſophy, ſignifies a body, or any power in general, which produces or tends to produce any effect by its actual motion, or tendency to motion. See POWER and ACTION.

AGENT, among merchants, denotes a perſon intruſted with the management of an affair, or who tranſacts the buſineſs of another.

Moral AGENT, a rational creature, capable of regulating his actions by a certain rule.

AGENT *and Patient*, in law, is ſaid of a perſon who is at once the doer of a thing, and the party to whom it is done. Thus if a man who is indebted to another, makes his creditor his executor, and dies, the executor may retain ſo much of the goods of the deceaſed as will ſatisfy his debt; by which means he becomes agent and patient; that is, the perſon who both pays and receives the debt.

AGEOMETRIA, ſomething defective with regard to geometry, or not founded on the principles of that ſcience.

The word is Greek, and compounded of *α*, priv. and *γεωμετρια*, geometry.

AGERATUM, Maudlin, in botany, a plant with a woody root, variouſly contorted, and as thick as one's little finger, and full of ſmall fibres; from this ariſe ſtalks a cubit high, which are ſlender, round, branched, and of a reddiſh colour, though ſome are of a pale green. This plant has a vaſt number of narrow leaves, an inch or two in length, and deeply ſerrated on the edges; on the top of the branches are bunches compoſed of radiated yellow flowers, whoſe diſk conſiſts of many floretts, but the borders are compoſed of half floretts; the embryoes are lodged in the flower-cap, which is ſcaly, and each becomes one ſlender ſeed of a pale yellow colour. It has been ſuppoſed to open obſtructions of the viſcera, being taken in infuſion or decoction; but is now little uſed for that purpoſe. *Brookes's Natural Hiſt.*

AGGLUTINANTS, in pharmacy, a general name for all medicines of a glutinous or viſcous nature; which, by adhering to the ſolids, contribute greatly to repair their loſs.

The word is Latin, *agglutinantia*, and compounded of *ad*, to, and *gluten*, glue.

AGGLUTINANTS, among ſurgeons, are topical remedies of a glutinous texture, as the turpentines, ſarcocolla, iſinglaſs, &c.

AGGLUTINATION, among phyſicians, implies the action of reuniting the parts of a body, ſeparated by a wound, cut, &c.

It is alſo applied to the action of ſuch internal medicines as are of an agglutinating quality, and which, by giving a glutinous conſiſtence to the animal fluids, render them more proper for nouriſhing the body.

AGGRAVATION, the action of heightening a fault, or rendering it more criminal.

AGGREGATE, in a general ſenſe, implies the ſum of ſeveral things added together, or the collection of them into one total.

The word is compounded of the Latin, *ad*, to, and *grex*, a flock, or company.

Thus natural bodies are the aggregate or aſſemblages of corpuſcles, united together by the principle of attraction; and the aggregate of the ſeveral quantities is the ſum of theſe quantities. See the article SUM.

AGGREGATION, in natural philoſophy, ſignifies a ſpecies of union whereby ſeveral things, not connected by nature, are collected together, ſo as to form one whole.

AGGRESSOR, in law, ſignifies the perſon who began the quarrel, or gave the firſt aſſault.

It is of the utmoſt importance to know which of the two parties is really the aggreſſor, and accordingly this matter is ſtrictly enquired into by the court.

AGIADES, in the Turkiſh armies, are a ſort of pioneers, employed in fortifying camps, and the like offices.

AGIDIES, in antiquity, was an epithet which the pagans gave to the prieſts of Cybele.

The word ſignifies jugglers, or thoſe who play tricks of legerdemain.

AGIO, in commerce, is a term chiefly uſed in Holland, and at Venice, to ſignify the difference between the value of bank ſtock and the current coin.

The agio, in Holland, is generally three or four per cent. and at Rome it is from fifteen to twenty-five per cent. but at Venice the agio is fixed at twenty per cent.

AGIO is alſo uſed to ſignify the profit ariſing from diſcounting notes, bills of exchange, &c.

AGIOGRAPHA, a name given to thoſe books which are read in the church as proper for edification only. They form what is generally called the apocrypha.

The word is Greek, and compounded of *αγιος*, ſacred, and *γραφω*, to write.

AGISTMENT, or AGISTATION, in law, ſignifies the taking in other people's cattle to graze at ſo much per week.

The term is peculiarly uſed for the taking cattle to feed in the king's foreſts, as well as for the profits ariſing from that practice.

Agistment is alſo uſed in a metaphorical ſenſe to ſignify any tax, burden, or charge. Thus the tax levied for repairing the Banks of Romney Marſh, was called agiſtamentum.

AGISTOR, or Agistator, an officer belonging to foreſts, who has the care of the cattle taken in to be grazed, and who levies the monies due on that account. They are generally called queſt-takers, or giſt-takers, and are created by letters patent. Each royal foreſt has four agiſtors.

AGITATION, the act of ſhaking a body, or toſſing it backwards and forwards.

The word is Latin, *agitatio*, and derived from *agito*, to ſhake.

Philoſophers apply this term to a ſpecies of earthquake called tremor and arietatio; and phyſicians to the ſhaking or motion of the inteſtinal parts of a natural body.

AGITATORS, in the Engliſh hiſtory, were certain officers ſet up by the army in 1647, to take care of its intereſts. Cromwell joined the agitators in order to promote his own intereſts; and accordingly cauſed them to be aboliſhed as ſoon as his own power was ſufficiently eſtabliſhed.

AGLEETS, Aglets, or Agleeds, among botaniſts, the ſame with what is more generally called apices. See the article Apices.

AGLIBOLUS, in mythology, an ancient deity of the Syrians, worſhipped at Palmyra. He was repreſented as a young man dreſſed in a tunick, girded round his waiſt, and reaching to his knees. The figure of the moon was placed on his buſkins, and he held a javelin in his right hand, and a ſmall baton, reſembling a roll, in his left.

The Palmyreans worſhipped the ſun under the name of *agliibelus*, which ſeems to be formed from the Arabic *ag*, *al*, *bal*, which ſignifies conſider, and *belus*, or *belenus*, another name for Apollo, or the ſun.

AGNOITÆ, or Agnoites, a ſect of heretics that appeared about the year 370. They were the followers of Theophronius, the Cappadocian, and called in queſtion the omniſcience of the Supreme Being; alledging that he knew things paſt only by memory, and things future only by a precarious uncertain preſcience.

There was another ſect of heretics called by the ſame name, who maintained that Chriſt, with reſpect to his human nature, was ignorant of many things, and particularly of the Day of Judgment.

AGNOMEN, among the ancient Romans, was a kind of fourth, or honorary name, given to a perſon on account of ſome extraordinary action, virtue, or other accompliſhment.

AGNUS *Caſtus*, the chaſte-tree, in botany, is a ſmall tree, or rather ſhrub, with tough branches, digitated narrow leaves, and monopetalous purpliſh flowers, ſtanding in ſpikes on the tops of the branches, followed by oblong whitiſh ſeeds. It is a native of the warmer climates, and cultivated in ſome of our gardens.

The ſeeds of this plant were formerly conſidered as antiphrodiſiacs; perhaps on no other foundation than the ceremony obſerved by the Grecian matrons of old, of ſtrewing the leaves in the temples, at the celebration of the chaſte feſtivals of Ceres. Experience does not diſcover in them any ſuch virtue, and ſome have even aſcribed to them an oppoſite tendency.

But of whatever kind their virtues are, they do not, from their ſenſible qualities, appear to be very conſiderable. The ſeeds, as met with in the ſhops, have very little taſte, and ſcarcely any ſmell, though deſcribed by authors as very hot and biting: extracts made from them, by water or ſpirit, are weakly bitteriſh, and ſomewhat pungent. They ſeem to abound chiefly with a groſs inſipid oil, of the expreſſible kind, which is, in part, taken up by rectified ſpirit, and ſeparates and falls to the bottom during the inſpiſſation of the tincture. The oily matter is of a deep ſaffron colour, the inſpiſſated extract ſomewhat paler. *Lewis's Hiſtory of the Materia Medica.*

Agnus Dei, in the Roman church, ſignifies a cake of wax, ſtamped with the figure of a lamb ſupporting a croſs.

Theſe are conſecrated with great ſolemnity, and afterwards diſtributed to the people.

The words are pure Latin, and ſignify *lamb of God*; a name given it from the figure impreſſed upon it.

Agnus *Scythicus*, the Scythian lamb, in natural hiſtory, the name of a fictitious plant, reſembling a lamb, ſuppoſed to grow in Tartary. But Kæmpfer, who viſited this country, and made the moſt diligent enquiry after the Scythian lamb, was at laſt convinced that it has no exiſtence: and that the curioſities ſhewn under this name, are nothing more than factitious ſubſtances, partly formed out of the capillary roots of certain plants.

AGOGE, among the ancient muſicians, ſignified a ſpecies of modulation, when the notes proceeded by contiguous degrees.

The word is Greek, αγωγη, and derived from αγω, to lead.

AGON, among the ancients, implied any diſpute or conteſt, whether it had regard to bodily exerciſes, or the accompliſhments of the mind: and therefore poets, muſicians, painters, &c. had their agones, as well as the athletæ.

The word αγων is a radix, in the Greek language, and ſignifies a conteſt.

Games of this kind were celebrated at moſt of the heathen feſtivals, with great ſolemnity, either annually, or at certain periods of years. Among the latter were celebrated at Athens, the *agon gymnicus*, the *agon nemæus*, inſtituted by the Argives in the fifty-third Olympiad, and the *agon Olympius*, inſtituted, by Hercules, 430 years before the firſt Olympiad.

The Romans alſo, in imitation of the Greeks, inſtituted conteſts of this kind. The emperor Aurelian eſtabliſhed one under the name of *agon ſolis*, the conteſt of the ſun; Diocleſian another, which he called *agon capitolinis*, which was celebrated every fourth year, after the manner of the Olympic games.

Agon alſo ſignified one of the miniſters employed in the heathen ſacrifices, and whoſe buſineſs it was to ſtrike the victim.

AGONALIA, among the ancient Romans, were ſolemn feaſts celebrated in honour of the god Janus, or, according to ſome writers, in honour of the god Agonius, whom the Romans always invoked before they undertook any enterprize of importance.

AGONISTICI, a name given, by Donatus, to ſuch of his diſciples as he ſent to fairs, markets, and other publick places, to preach and propagate his doctrine.

AGONITHETA, in ancient hiſtory, the preſident or magiſtrate who preſided at the ſacred games, and adjudged the prizes to the victors.

The word is Greek, and compounded of αγων, conteſt, and τιθημι, to place, or diſpoſe.

AGONY, among phyſicians, denotes extreme pain, or the utmoſt efforts of nature ſtruggling with a diſeaſe.

AGONYCLITÆ, or Agonyclites, in eccleſiaſtical hiſtory, a ſect of Chriſtians in the ſeventh century, who always prayed in a ſtanding poſture, thinking it unlawful to kneel.

The word is Greek, and compounded of α, priv. γονυ, the knee, and κλινω, to bend or incline.

AGORÆUS, in antiquity, an epithet applied to ſuch deities as had ſtatues in the market places.

The word is Greek, and derived from αγορα, a market.

AGRANOMUS, a magiſtrate eſtabliſhed by the ancient Greeks at Athens, to regulate the weights and meaſures, the prices of proviſions, &c.

The word is Greek, αγορανομος, and compounded of αγορα, a market, and νεμω, to diſtribute or direct.

AGRARIAN, in a general ſenſe, implies ſomething belonging to, or connected with lands.

The word is derived from the Latin, *ager*, a field.

Agrarian *Laws*, among the Romans, were thoſe relating to the diviſion and diſtribution of lands; and of theſe there were a great number; but that called the

Agrarian law, by way of eminence, was publiſhed by Spurius Caſſius, about the year of Rome 268, for dividing the conquered lands equally among all the citizens, and limiting the number of acres each citizen might enjoy.

AGREEMENT, in law, ſignifies the conſent of two or more perſons to any thing done, or to be done.

AGRICULTURE, in a general ſenſe, implies the art of rendering the earth fertile by tillage and culture.

The word is Latin, *agricultura*, and compounded of *ager*, a field, and *colo* to till.

If we look into the earlieſt accounts of the eaſtern nations, their magnificent and populous cities, and their numerous armies, we ſhall have ſufficient reaſon to think, that agriculture was then arrived at a conſiderable perfection; ſince it could ſupply the inhabitants in general with all the neceſſaries of life, and the great with the moſt delicate luxuries. This will appear ſtill more evidently, if we reflect on the judicious conduct of the Egyptians, in the diſpoſition of their country, with reſpect to the inundations of the Nile, and the great advantages they had been taught to reap from it, as deſcribed by Herodotus. The poſſeſſions of the children of Iſrael muſt have been cultivated with the utmoſt ſkill and aſſiduity, or they could never have afforded ſuſtenance to the prodigious numbers of people, who, as indiſputable authority informs us, inhabited that ſmall ſpot. But time has robbed us of their knowledge in this moſt uſeful of arts.

In the moſt enlightened ages, books of Huſbandry were compoſed by men whoſe exalted ſtation ſufficiently indicates the high value then ſet upon the art they taught. Xenophon, equally diſtinguiſhed in philoſophy and in arms, ſhews, by his commendations of Cyrus, the eſtimation in which agriculture was held by both thoſe great men. Hieron, king of Syracuſe, did not think it beneath his dignity to write upon this eſſential art, for the benefit of his ſubjects. The chiefs of the two greateſt republics in the world, Cato, conſul of Rome, and Mago, ſufes of Carthage, employed part of their time in teaching the art of huſbandry. Theſe pieces are, in the opinion of the ancients, the beſt calculated for explaining rural affairs. Amidſt the Aſiatic luxury, and that of the Roman empire, valuable treatiſes of huſbandry appeared, written by Attalus, king of Pergamus; by Archelaus, king of Cappadocia; by Valerius Aſiaticus, who was judged worthy of the empire, after the death of Caligula; and by the emperor Albinus.

Some few fragments of the Greeks are the firſt rudiments of huſbandry upon record; and the elder Cato is the moſt ancient Latin author whoſe writings upon this intereſting ſubject have reached our hands. His inſtructions are very judicious, but too conciſe. Varro added elegance of language to an improved Treatiſe of Agriculture; and, ſoon after him, Virgil publiſhed his juſtly admired Georgics; by far the moſt laboured and highly finiſhed of all his works: theſe, indeed, he had moſt at heart; and upon theſe he choſe to reſt his future reputation. Columella afterwards collected, with great judgment, whatever was valuable in the writings of his predeceſſors, and enriched them with his own obſervations on the ſubject. His work is one of the choiceſt remains of antiquity, and has ſcarcely been equalled by any author ſince his time.

The irruptions of the barbarous nations of the north, unacquainted with the ſweets of ſociety, and the bleſſings of civil liberty, ſoon aboliſhed improved agriculture. Arms were their only object. Their meaneſt ſlaves were intruſted with their trifling huſbandry; and trifling it muſt have been during that unſettled ſtate of nations. Theſe innumerable and enterpriſing barbarians, who over-ran all Europe, were originally ſhepherds or hunters, like the preſent Tartars and the ſavages of America. They contented themſelves with poſſeſſing, without labour or trouble, the vaſt deſarts which their arms had made, and cultivated, very ſuperficially, only a ſmall ſpot near their habitations. The abject condition of thoſe whom they employed for this purpoſe, unfortunately and unjuſtly cauſed the occupation itſelf, then to be looked upon as mean and ignoble. But when governments began to be founded upon more fixed and rational plans, agriculture, with the other arts, reared its head, and throve in proportion as property became ſecure. A commonwealth gave the firſt riſe to the ſalutary change: for Venice may boaſt, that her Camillo Tarello was the firſt good author on this important ſubject, after the revival of uſeful knowledge.

The improvements made in England, in the reign of queen Elizabeth, ſhew, that the proteſtants, who were obliged to take ſhelter in the then free ſtates, and particularly in Switzerland, had, with their love of liberty, learned an improved agriculture. In the next age, Hartlib is not leſs famed for his knowledge in farming, than for his friendſhip with Milton. The return of the men of genius, who had fled their country during Cromwell's uſurpation, and the protection granted them after the reſtoration, added greatly to the progreſs of agriculture. At this period, from which England may date her grandeur, wealth, and power, writers of great character undertook the truly patriotic art. Such were Platt, Worlidge, Evelyn, &c. whoſe works did honour to the age, and proved highly beneficial to their country. The ſame laudable ſpirit appeared in an elegant ſyſtem, publiſhed about this time by the ingenious and learned counſellor Conrad Herreſbach, in Germany; where a ſpecial attention to agriculture had begun to be the great object of ſeveral ſtates, when a total ſtop was unhappily put to every thing of this kind, by the late war.

In France, two eminent phyſicians thought this ſubject worthy of their pens, and gave their country the *Maiſons Ruſtiques*, a work which, afterwards perfected by a third phyſician, has undergone twenty-two editions. Nor does that country now by any means loſe ſight of this important ſubject. Real philoſophers there make it their ſtudy, and purſue a ſeries of well-made experiments with ſuch indefatigable care and accuracy, as cannot fail of producing very great advantages; whilſt their monarch wiſely protects and patronizes their undertakings. In the ſame manner the emperor of China, throughout his wide dominions, rewards the huſbandman, who makes the beſt and greateſt improvements in his land, with the dignity of a mandarin of the eighth claſs. The names of ſeveral illuſtrious improvers in France, deſervedly diſtinguiſhed for their patriotic application to this ſtudy, will appear in many articles of this work. A ſociety in Brittany, in particular, have begun upon a moſt judicious plan, which promiſes ſuch ſucceſs as muſt prove extremely beneficial to their country.

In Switzerland, a ſociety eſtabliſhed at Berne has already favoured the world with ſuch ſpecimens of the great judgement of its illuſtrious members, as leave no room to doubt but that their diſtinguiſhed care and aſſiduity will be a laſting ſource of advantages to all mankind.

In Sweden, a genius has ariſen, who will ever deſerve the higheſt commendation in the hiſtory of Agriculture; though this is but a ſecondary part in his character. Linnæus has rouſed a ſpirit of enquiry into, and love of natural knowledge, which will undoubtedly be attended with conſpicuous emoluments to his native land.

In Denmark, a king, who, like our moſt auguſt ſovereign, makes the happineſs of his people the chief object of his care, is ſo attentive to agriculture, that thoſe gentlemen who travel at his expence, in order to learn, and introduce into his kingdom, every uſeful art, are directed to be particularly attentive to the art of huſbandry.

The general ſpirit of improvement in agriculture, ſo remarkably exerted in the different nations of Europe, calls upon us not to loſe that ſuperiority which the happineſs of our conſtitution and climate have given us.

The ſociety of improvers in the knowledge of agriculture in Scotland, will ever deſerve ſincere thanks for many proofs of that truly laudable ſpirit which conſults the general good of mankind. Its worthy members ſet the noble example, and were firſt followed by the Dublin ſociety; next by another ſociety at Edinburgh; and now by one in London, in the more extenſive manner of adding premiums to the inſtruction only which the former gave.

The ſociety in Dublin have diſtinguiſhed themſelves ſo remarkably by their ſound and unwearied judgement and aſſiduity, in promoting the real intereſt of their country, that the parliament of that kingdom are now become their patrons, and have, with a truly public ſpirit, ordered large ſums for carrying into execution their uſeful deſigns. Their obſervations, replete with excellent inſtructions, want only to be continued and increaſed.

The London ſociety for the encouragement of arts, manufactures, and commerce, is formed upon a plan ſo univerſally beneficent, and directed by gentlemen of ſuch high rank, and great abilities, as, when we conſider that they actually take every opportunity, which prudence and intelligence can ſuggeſt, to promote the laſting welfare of their fellow-citizens, ſcarcely leaves room for any farther wiſh, unleſs it be, that they would impart to the whole world ſome portion of their treaſures of uſeful knowledge. See SOCIETY *for the Encouragement of Arts, &c.*

That the real ſtrength of every country depends upon its population, is a well known truth; and a little acquaintance with the principles of ſound policy will ſhew, that the only ſolid baſis of a numerous population is agriculture. Without this, the ſubſiſtence of a nation is precarious. Uncertainty of ſubſiſtence hinders people from marrying, and even induces them to quit their native ſoil. Huſbandmen, whoſe children are their riches, are, of all perſons, the fitteſt and moſt inclined to propagate their ſpecies. Trade, though a great, is but a ſecondary, ſource of wealth, and will, if carried too far, deſtroy the parent which gave it birth, by diminiſhing agriculture, depopulating the country, and annihilating, by degrees, that eſſentially neceſſary claſs of men who cultivate the earth. Indolence and avidity will tempt them to quit a laborious occupation, for one that is attended with leſs toil and more lucre; though it be at the ſame time very precarious. The eaſe with which the artificers of luxury live, ſeduces the indigent peaſant, draws him to towns and cities, and the country is deſerted. But if agriculture be properly countenanced, encouraged, and put in ſo flouriſhing a ſtate as to afford a comfortable ſubſiſtence to the very great numbers that may be employed in it, the huſbandman will not forſake the ſolid occupation of his forefathers, to which he has been trained up; commerce will not exceed the bounds within which it ought to keep; luxury, that bane of mankind, will be effectually checked; and a martial ſpirit will animate every free-born youth:—for the courage of the lower claſs of unemployed people is but a kind of machinal inſtinct, allied at moſt with a certain love for their country, blended with the love of their own poſſeſſions. It is the robuſt labourer, hardened by fatigue, and by being expoſed to all ſorts of weather, who has the greateſt inward feeling of his own ſtrength: it is the huſbandman who is moſt firmly attached to his country, by the portion of land which maintains him. The artiſt, who ſettles wherever he finds employment, cannot, ſtrictly ſpeaking, be ſaid to have any country; though an uſeful member of the community, his retired ſedentary life weakens his body, and depreſſes the ſpring of that ſpirit of liberty, which elevates the ſoul as much as the ſervile courſes of luxury debaſe it:—of that ſpirit which ſo nobly diſtinguiſhed our illuſtrious forefathers, and which we have ſo lately, with pleaſure, ſeen revived in our preſent countrymen. Such was the ſpirit of the real Romans, of theſe conquerors of the world, whoſe only profeſſions were arms and agriculture, and who made equal improvements in both: nor, indeed, can any two in the whole circle of human employments be more fitly joined: for the ſturdy labouring youth, bred up to ſobriety and rural toil, makes the hardieſt ſoldier; and he who knows the fatigues and dangers of war, chearfully returns to the culture of his farm. Theſe were the men moſt prized by thoſe maſters of the univerſe: and, at this very day, the Arabians, who live under tents in the country, and remove occaſionally from place to place, deſpiſe the reſt of their nation who live in towns, look upon them as daſtardly and effeminate; and, after repeated defeats, now keep them in ſubjection.

Thoſe who imagine that a country life is repugnant to politeneſs, are ſurely much miſtaken. True politeneſs, the moſt cordial affection, the ſincereſt friendſhip, and unfeigned courteſy, without the grimace of ſtrained compliments, have often been found among the labouring rural race, inhabitants of thatched cottages. The appellations of rude and ruſtic were never given to really uſeful occupations, till luxury had debauched mankind, and a frivolous pertneſs uſurped the place of ſenſe and manners. Till then, men naturally eſteemed an art, of which every day's experience ſhewed them the abſolute neceſſity, as well as the great advantages: If the generality of country gentlemen are reproached with ruſticity of manners, it is their paſſion for ſporting, as they call it, and not their application to agriculture, which gives them that behaviour. There would be no room for this imputation, if they were oftener in the field with their workmen, than upon the turf, or in the thickets with their horſes and dogs.

But whilſt we are diſplaying a ſmall part only of the praiſe juſtly due to agriculture, let it not be imagined that, in our opinion, every man ſhould be a farmer. This is ſo far from being neceſſary, that it would inevitably bring us back to barbariſm. It is ſufficient that thoſe who are deſtined to it, be inſtructed and protected; and it will always be right in the legiſlature to conſider and examine the due degree of eſtimation in which this art ſhould be held, the juſt hopes that may reaſonably be entertained of its further progreſs, and the means by which it may beſt be carried to the greateſt perfection.

By proper application to this eſſential art, the philoſopher, from whom we muſt expect the greateſt improvements, will have a pleaſing opportunity of gratifying his deſire, by enlarging his knowledge of nature: the individual, who puts in practice the diſcoveries of the philoſopher, will find the ſureſt way of increaſing his fortune; and the ſovereign, who directs and favours the labours of all, will eſtabliſh his power, independent of all others, upon a foundation which cannot be ſhaken.

Agriculture may be ſubdivided into three different parts, comprehending the different ſoils required to be tilled:

1. Arable lands of all kinds, whether the ſoil be ſandy, clayey, loamy, &c. See SANDY, CLAY, LOAM, &c.

2. Lands employed in paſturage, whether meadow, marſhy, or boggy. See MEADOW, BOGGY, &c.

3. Wood-lands, or thoſe laid out in nurſeries, plantations, foreſts, woods, &c. See WOOD-LANDS, FORESTS, &c.

The reader will alſo find under the name of each tree and vegetable, as oak, beech, &c. wheat, barley, &c. the beſt methods of cultivating it to advantage. See alſo the different operations of huſbandry; as PLOWING, SOWING, &c.

AGRIFOLIUM, the ſame with aquifolium. See AQUIFOLIUM.

AGRIMONIA, Agrimony, in botany, the name of a hairy plant, with winged leaves, compoſed of oblong indented ſegments, with ſmaller portions between, ſet on middle ribs which ſtand alternately on the ſtalk: on the top grows a like ſpike of pentapetalous yellow flowers, followed by little burs, containing, each, one or two ſeeds. It is perennial, and grows wild in hedges, and about the ſides of fields.

The leaves of agrimony have a ſlightly bitteriſh roughiſh taſte, accompanied with an agreeable, though very weak, aromatic flavour. The flowers are, in ſmell, ſtronger and more agreeable than the leaves, and in taſte ſomewhat weaker. They readily give out their virtues both to water and to rectified ſpirit: the leaves impart to the former a greeniſh yellow; to the latter a deep green colour: the flowers yield their own deep yellow tincture to both menſtrua. In diſtillation with water, there ariſes a very ſmall portion of a yellowiſh eſſential oil, which ſmells ſtrongly and agreeably of the herb.

Agrimony is one of the milder corroborants; and in this intention is ſometimes employed, eſpecially among the common people, againſt habitual diarrhœas, and cachectic, and other indiſpoſitions from a lax ſtate of the ſolids: infuſions of the leaves, which are not ungrateful, may be drank as tea. It is ſometimes joined with other ingredients in diet drinks for purifying the blood; and in pectoral apozems. *Lewis's Hiſtory of the Materia Medica.*

AGRIMOIDES, in botany, is the name of a genus of plants with roſaceous flowers, which, together with their cups, are received into another funnel-ſhaped cup, fimbriated at the edges. The proper cup of the flower becomes at length a pointed oval fruit, generally containing only one ſeed. It flowers in April, and grows in ſome of the mountainous parts of Italy. It agrees in its medicinal virtues with the agrimonia deſcribed in the preceding article.

AGRIMONY. See AGRIMONIA.

AGRIPPA, a name given by the ancients as well as modern phyſicians, to children born with their feet foremoſt. See DELIVERY.

AGROSTEMA, in botany, a diſtinct genus of decandrious plants, according to Linnæus; but comprehended by Tournefort in that of Lychnis. See LYCHNIS.

AGROSTIS, in botany, a diſtinct genus of plants, called in Engliſh quick-graſs, or couch graſs. See the article COUCH-GRASS.

AGROSTOGRAPHY, among naturaliſts, implies the hiſtory, or deſcription of graſſes.

The word is formed from the Greek, *αγρωστις*, graſs, and *γραφω*, to deſcribe.

Scheuchzer has publiſhed a treatiſe under the title of Agroſtographia, containing an accurate deſcription of ſeveral hundred ſpecies of graſs.

AGRYPNIA, among phyſicians, implies an inaptitude to ſleep, a troubleſome ſympton of feveriſh and other diſorders.

The word is Greek, *αγρυπνια*, and compounded of *α*, priv. and *υπνος*, ſleep.

AGRYPNIA, in the Greek church, implies the vigil of any of the greater feſtivals.

AGUAGUIN, in botany, the name of a ſhrub, whoſe leaves reſemble thoſe of our lilac; they grow alternately, and ſtand on foot ſtalks half an inch long. It is a native of Africa, where it is greatly eſteemed for its balſamic and vulnerary qualities.

AGUARA PONDA, in botany, the name of a ſpecies of violet, which grows to near a foot and a half in height, and bears a great reſemblance to the viola martia. See VIOLET.

AGUE, a general name for all periodical fevers, which, according to the different times of the returns of the feveriſh paroxyſm, are denominated tertian, quartian, and quotidian.

Tertian AGUE, is that which attacks the perſon every other day.

There is no fever which diſcovers the nature and genius of the febrile motion in general, and which at the ſame time infeſts the veſſels and nervous parts, ſo much as the tertian. It ſpares neither age, temperament, nor ſex.

When this ſpecies of intermitting fever is of the regular kind, it is attended with the following ſymptoms: at firſt, the head aches, the limbs ſeem weary, there is a pain in the loins about the firſt vertebra of the back, and which aſcends towards the epigaſtrium, with a painful ſenſe of a tenſion in the hypochondria, and a coſtiveneſs of the body. This is ſucceeded by a coldneſs of the external parts, eſpecially of the noſe and ears, a ſtretching, yawning, ſhivering, and ſhaking, ſometimes ſo much as to make the bed tremble under the patient; the pulſe is ſmall, contracted, and weak; ſometimes the patient is troubled with thirſt; then follows a nauſea, with a fruitleſs reaching to vomit; but ſometimes a pituitous, bilious, or green matter is brought up, commonly joined with a troubleſome cough, and an expectoration of phlegm, derived from the acid, clammy crudities of the ſtomach; to theſe ſucceeds an anxious, burning, and dry heat, which pervades the whole body; the face, which was collapſed and pale, the contracted, rigid ſkin, and the almoſt empty veſſels of the hands and feet, begin to riſe, grow red and turgid; the pulſe becomes more great, full and quick, reſtleſſneſs increaſes, the breathing is more difficult, and the patient, with his eyes almoſt cloſed, begins to talk a little wildly.

In ſome time the ſymptoms begin to abate, the heat becomes mild, the ſkin relaxes and becomes moiſt; the urine is of a flame colour, but without ſediment; the pulſe is more moderate, and then a ſweat breaking out, terminates the paroxyſm.

The duration of the fit is uncertain; ſometimes it ends in ten or eleven hours, and ſometimes not in twenty-four. On the intercalary day, the body is ſtill feeble and coldiſh, with a diſpoſition to ſhiver; the pulſe is ſlow and weak; the urine is turbid and depoſits a ſediment, or there is a nubecula, which ſhews a diſpoſition thereto.

The baſtard or ſpurious Tertian AGUE is attended with milder ſymptoms, the heat is not ſo burning, the vomiting is not ſo frequent, and the urine is not ſo high-coloured; but then it is more lingering, and on the intermediate day there is a laſſitude and want of appetite. This attacks men of an inactive diſpoſition, and women whoſe bodies are of a looſe texture, in the autumnal ſeaſon.

The fit of the irregular tertian obſerves no particular time, for it ſometimes comes on in the morning, ſometimes in the afternoon, in the evening, or at midnight. The paroxyſm is ſometimes longer, ſometimes ſhorter; the urine lets fall no ſediment within the time of remiſſion or intermiſſion; the ſweating is either too ſparing or too profuſe. When the fit is off ſeveral remarkable ſymptoms often appear, as a looſeneſs, a bleeding at the noſe, ſickneſs at the ſtomach, a violent heart-burn, or pains in the belly. Theſe ſort of agues are generally epidemic, and moſt commonly appear in the ſummer and autumn.

Sometimes a tertian ague is double, which may be diſtinguiſhed from a quotidian, by the time of the fits, which is not the ſame every day, but every other day.

Continual Tertian AGUE is that which begins with ſhivering and ſhaking, an anxiety, vomiting, loſs of ſtrength, and then a violent heat. The fits do not intermit, but only remit. The pulſe continues frequent with heat and debility, and all the ſymptoms return with freſh vigour every other day; but at length admit a perfect intermiſſion.

An endemic Tertian AGUE is proper to certain places, of a low ſituation, and full of marſhes, which produce a great number of gnats and other inſects, ſuch as ſome parts of Kent, and the Hundreds of Eſſex. In ſuch places the natives themſelves have ſlight attacks of it every year, and ſtrangers ſeldom or never eſcape without a preſervative, which is only the bark infuſed in brandy, with a little ſnake-root, two ounces of which are to be taken night and morning.

A Quartan AGUE is that which has two fits in four days, or two days quite free from a fit.

It generally begins about four or five in the afternoon, though ſometimes ſooner and ſometimes later, with a great laſſitude, ſtretching, a blunt pain in the head, back, loins, and legs; the feet and hands are cold, the whole body is pale, the face and nails livid, and the whole body affected with a ſhivering and ſhaking. The tongue and the lips tremble, the breathing is difficult, with reſtleſſneſs and toſſing; the pulſe is contracted and hard, and ſometimes unequal; and there is an anxiety about the præcordia. Theſe ſymptoms continue about two or three hours; in ſome the body is coſtive, in others there is a ſtimulus to ſtool and to make water: in ſome there is a nauſea or vomiting, with ſtools. Some advanced in years have their minds pretty much diſturbed: the heat comes on gradually, not burning but dry; the pulſe becomes equal, quick, and large; but the dull pain in the head remains, with a vertiginous affection; the ſkin becomes a little moiſt; and in about four or ſix hours the ſymptoms vaniſh, except a dull pain in the bones, joints, and feet. The urine during the fit is ſometimes thin and watery, ſometimes thick, and depoſits a ſediment.

Sometimes a quartan ague is double, that is, when the fits come on every day at different hours; and it is ſpurious when a paroxyſm begins at any other time of the day than that abovementioned. It is ſaid to be continual when on the intercalary days, there are ſhiverings and pandiculations, with a greater heat than uſual, a quicker pulſe, a want of appetite, a debility, a dryneſs of the mouth, a lightneſs of the head, a diſturbed ſleep, and a reddiſh urine, with a thick roſe-coloured ſediment.

A Quotidian AGUE, *or Fever*, returns every day, and is not ſo common as the tertian or quartan.

The acceſſion of this fever is about four or five in the morning, with cold and ſhivering; to which ſucceeds a cardialgic nauſea, and inflation of the belly; in ſome a pain in the head, in others fainting fits; in moſt, vomiting or ſtools, or both: then comes on a moderate heat, with thirſt, but not very intenſe; the pulſe, which was before irregular and weak, becomes more quick, but not very hard; the urine is not of a flame, but rather of a citron colour, and turbid. Some are exceeding ſleepy. At length a moderate ſweat ſupervenes; and in about ten hours the fit goes off, leaving the body dull and heavy.

When this diſeaſe varies from the above deſcription, it is then called ſpurious or anomalous.

From theſe ſymptoms it appears, that the whole nervous ſyſtem is exagitated, and ſuffers greatly by ſpaſtic conſtrictions, which, proceeding chiefly from the medulla ſpinalis, affect preternaturally, not only the coats of the veſſels, but all the fibres throughout the body, and thence greatly diſturb the motion both of the ſolids and fluids.

The material cauſe of this, and all other fevers, is a matter of an active nature, endued with a cauſtic acrimony, which ſolicits the internal and exquiſitely ſenſible parts to ſpaſmodic contractions. It is generated chiefly in the biliary ducts and flexure of the duodenum, where the vitiated, bilious, ſalival, and pancreatic juices, meeting with the crudities of a bad digeſtion, ferment together, and not being timely expelled, become virulent. This matter, paſſing through the lacteals, into the blood, and thence into the nervous parts of the head, medulla ſpinalis, inteſtines, and ſtomach, as alſo to the nervous coats of the excretory and ſecretory ducts, excite an univerſal ſpaſm, which forces the blood, firſt to the interior and greater veſſels; afterwards the ſyſtoltic motion of the heart and arteries being increaſed, the motion of the whole maſs of blood and humours is accelerated, the obſtructions of the ſmall veſſels of the nervous parts are opened; upon which the ſpaſm ceaſing, the excretory ducts are relaxed, the febrile matter paſſes off through the pores of the ſkin by perſpiration or ſweat, and the fit ceaſes, till, by the generation of freſh matter, a new paroxyſm is produced. *Hoffman.*

It appears from the experiments of Langriſh, that the blood in quotidians is more denſe and tenacious than in tertians; and in tertians than in quartans: ſo that in quotidians, cæteris paribus, it comes neareſt to an inflammatory ſtate; and it is commonly obſerved, that if the fever, from a regular tertian, runs into a ſemitertian or quotidian, or greatly anticipates the time of the regular paroxyſm, a remitting or continual fever is ſoon the conſequence.

It is neceſſary to be known, that, from February to Auguſt, fevers are ſaid to be vernal; and from Auguſt to February, autumnal; and, that in the beginning of the autumn, they often reſemble continual fevers, and require a different manner of cure.

No fever emaciates a patient ſooner than a tertian, if attended with a more intenſe and laſting heat. The autumnal and winter agues are obſtinate and hard to cure, eſpecially if there be any fault in the viſcera: on the contrary, the vernal and ſummer agues, if rightly treated, are eaſily vanquiſhed.

Agues, injudiciouſly managed, terminate in cruel and incurable diſeaſes; as a ſlow or hectic fever, a ſudden ſwelling of the feet, a dropſy, œdematous tumours, the jaundice, ſcobutic cachexy, the dry aſthma, the hypochondriac paſſion; and in infants, a fatal epilepſy. Sydenham obſerves, that a ſwelling of the abdomen in children, and of the legs in adults, denotes a ſolution of the diſeaſe; and that a pain in the tonſils, hoarſeneſs, hollow eyes, and a ghaſtly countenance, portend death.

As to the cure, when a load of vitiated humours in the ſtomach and duodenum require depletion, which is known from having indulged in too plentiful eating, from an anxiety of the præcordia, from eructations, and a bitter taſte in the mouth, a vomit of ipecacuanha, after the firſt fit, in the time of intermiſſion, is to be given. If it be an autumnal ague, purging and an emetic may be convenient to prepare the body for the bark, which is eſteemed a ſovereign remedy in this diſtemper; however, it is proper to ſee two or three fits over before the cure of an autumnal ague be attempted with the bark; in vernal agues leſs preparation is neceſſary.

If the bark be good, and freſh powdered, ſix drams, taken in the interval of two fits, are generally ſufficient to ſtop a vernal ague; and an autumnal one will ſeldom require more than an ounce. But though this quantity may remove the fit for the preſent, yet the uſe of the bark muſt be continued for a conſiderable time, to prevent a relapſe. After the fit is ſtopped, two or three doſes a day for the firſt week, and once a day for the ſecond week; and then once in three or four days for a month. In weak conſtitutions, infuſions and decoctions of the bark agree better than the ſubſtance. Some recommend plaiſters and cataplaſms; but theſe are leſs certain. A diarrhœa prevents the effects of the bark, and therefore ſhould be ſtopped with all convenient ſpeed.

When this diſtemper is attended with a quincy, or any great inflammations, obſtructions, or impoſthumes, the bark is dangerous, and ought not to be given before the removal of ſuch ſymptoms.

The cold bath is recommended as one of the laſt things in the cure of an ague: but this is not to be uſed in winter, nor by old or weak perſons. After all other things have proved unſucceſsful, a removal from a cold air to a warmer has performed a cure. *Shaw.*

AGUE-TREE, a name given by ſome to the ſaſſafras, on account of its febrifuge qualities.

AGUL, in botany, the name of a ſmall prickly podded ſhrub, conſidered by Linnæus as a ſpecies of tredyſarum. Its leaves reſemble thoſe of the knot-graſs; and its flowers are of a reddiſh colour, ſucceeded by red huſks.

AGUARAH, in antiquity, the name of a ſilver coin ſtruck by the Jews, and otherwiſe called gerah and keſhita.

AGUTI, in natural hiſtory, an American quadruped, of the rat kind, greatly reſembling a guinea-pig, both in ſize and ſhape.

The hairs of this creature are rigid and gloſſy, of a mixed colour, between red and brown, with more or leſs black. Its whiſkers are like thoſe of the rabbit kind; but, like the hog, its upper jaw is longer than its lower; and its ſuperior lip ſplit like that of the hare. Its tail is very ſhort, its eyes prominent, and its legs almoſt naked. It has ſix toes with nails on its hinder feet; whereas its fore-feet have only four. When tame it walks on its hinder feet, and takes every thing given it with its fore-feet, like a monkey.

This animal hides itſelf in hollow trees, and feeds on their roots; for which reaſon it is ſeldom very fat, though it never wants food. However, thoſe that are near the plantations live upon fruits, manioc, and potatoes; for which reaſon they are generally fleſhy and well-taſted.

AGYNANI, in eccleſiaſtical hiſtory, a ſect of heretics that appeared in the ſeventh century. They condemned all carnal commerce with women, and pretended that God was not the author of marriage.

The word is Greek, and compounded of *α*, priv. and *γυνη*, woman.

AH-AH, in gardening. See the article HAH-HAH.

A-HEAD, in navigation, any diſtance before a ſhip, or comprehended on that point of the compaſs to which ſhe ſterns, or points her fore-part; as land a-head, i. e. land lying immediately in that part of the horizon to which the courſe or the ſtern is directed.

AHOVAI, in botany, a genus of pentandrious plants, the flower of which conſiſts of one infundibuliform, or funnel-ſhaped leaf; and its fruit, which, in ſome meaſure, reſembles a pear, contains a triangular kernel. The fruit is poiſonous.

AJAXTIES, in antiquity, were feaſts celebrated at Salamis, in honour of Ajax the ſon of Telamon.

AID, in a general ſenſe, implies any kind of aſſiſtance given by one perſon to another.

AID, or AYDE, in law, denotes a petition made in court for calling in help from another perſon who has any intereſt in the lands, or other things conteſted.

AID-DE-CAMP; in military affairs, is an officer employed to receive and carry the orders of a general.

AID-MAJOR; a French term for an ajutant. See AJUTANT.

AID, in ancient cuſtoms, implied a ſubſidy paid by vaſſals to their lord on particular occaſions.

Royal AID, a term uſed by ſome writers to ſignify the land-tax.

AIDS; in the menage, are the ſame with what ſome writers call cheriſhings, and uſed to avoid the neceſſity of corrections. The inner heel, inner rein, &c. are called inner aids; as the outer heel, outer rein, &c. are termed outer aids.

AIEREBA, in natural hiſtory, the name of a fiſh, whoſe body forms a regular oval, and its head is placed within the verge of the thinner part.

AIGUA *Marina*. See the article AQUA *Marina*.

AIGUISCE, AIGUESSE, or EGUISCE, in heraldry, implies a croſs with its four ends ſharpened, but in ſuch a manner as to terminate in obtuſe angles.

AIR, in philoſophy, is a light, fluid, tranſparent ſubſtance, ſurrounding the earth to a very conſiderable height.

The word is Greek, *αηρ*, which ſignifies the ſame thing.

Several of the ancients conſidered the air as an element; but it is alſo certain that they uſed the word element in a different ſenſe than we do at preſent.

The air is generally eſteemed a fluid, though it differs from the general nature of fluids in three particulars: 1. In being compreſſible, a property unknown to any other fluid. 2. In being uncongealable, or fixed by any known method, as all other fluids may. 3. In being of a different denſity in every part, decreaſing from the earth's ſurface upwards; whereas other fluids are of an uniform denſity throughout. The air is therefore a fluid ſui generis, if it be properly any fluid at all.

That the air was created at firſt with the earth itſelf, is not to be doubted; and that there has been ever ſince a conſtant generation of particles of air by the mutual action of bodies upon each other, as in fermentations, and all kinds of natural and artificial chemiſtry, Sir Iſaac Newton thinks very reaſonable to ſuppoſe; and Mr. Boyle has given numerous experiments relating to the production of artificial or factitious air.

That the air is a heavy or ponderous body, muſt follow from the nature of the particles of which it conſiſts; and ſince thoſe particles ariſe from bodies of every kind known in or upon the earth, the conſtituent parts of air muſt be of a very heterogeneous nature, and infinitely various in their ſpecific gravities: whence alſo it will follow, that as the matter which compoſes the body of air, or atmoſphere, is always variable, its weight or gravity will be alſo different, as we conſtantly experience by the barometer. See the article BAROMETER.

As the particles of air, when ſeparated from bodies beyond the ſphere of corpuſcular attraction, are ſtrongly repelled from thoſe bodies; ſo this repelling power being mutual between the particles, they alſo conſtantly repel each other, and conſequently muſt obſerve an equal diſtance among themſelves: when, therefore, thoſe aerial particles are obliged, by an impreſſed force, to approach nearer to each other, the repulſe of power will react or reſiſt the ſaid force with an equal momentum; and thus cauſe what we call the renitency, elaſticity, or ſpring of the air.

This ſpring of the air muſt render its denſity always different in different altitudes from the earth's ſurface; for the lower parts of the air, being preſſed by the weight of the ſuperior parts, will be made to accede nearer to each other, and the more ſo as the weight of the incumbent air is greater: and hence it follows, that the denſity of the air is greateſt at the earth's ſurface, and decreaſes upwards in geometrical proportion to the altitudes taken in arithmetical progreſſion. See the article ATMOSPHERE.

Since we find, by experience, that the gravity of the air is ſo various, that at one time it will ſuſtain a pillar of mercury 31 inches high, when at another it will raiſe it but to the height of 28 inches, in the barometer; it follows, that we may take $29\frac{1}{2}$ inches of mercury for the mean altitude, and conſequently its weight for the mean weight of a pillar of air of the ſame baſe. But a column of mercury, whoſe baſe is one ſquare inch, and altitude $29\frac{1}{2}$, weighs about 15 ℔, which is equal to the preſſure of air on every ſquare inch; and therefore upon every ſquare foot it will be 2160 ℔; and allowing $14\frac{1}{2}$ ſquare feet for the ſurface of the body of a middle ſized man, it muſt ſuſtain a preſſure of 31320 pounds, or 14 tons, when the air is of a mean gravity. This prodigious force would cruſh us into a very ſmall compaſs, were it not that it is equal on every part, and counterballanced by the equal re-action of the ſpring of the air within us.

The weight of the air is proved by a great variety of curious experiments, the principal of which here follow:

1. By actually weighing it in a nice ballance, where we ſhall find that one gallon of air will weigh a dram very nearly. 2 By filling a glaſs tube with mercury, and inverting it in a baſon of the ſame fluid, where it will appear that a column will be ſupported in the tube by the ſole weight or preſſure of the air, to upwards the height of 28 inches. 3. By taking the air off from the ſurface of the quick-ſilver in the gage of the air-pump, which then immediately riſes by the preſſure of the external air. 4. By exhauſting a receiver placed over the hole of the braſs plate on the air pump, which will then be kept faſt on by the preſſure of the incumbent air. Or, 5. More demonſtratively, by exhauſting a ſmall receiver under one larger, and letting in the air at once upon it; which will then be faſtened to the plate as before, tho' not placed over the hole. 6. By placing the hand on the open receiver, and exhauſting, the weight of the air on the hand will be extremely ſenſible. 7. By placing a plain piece of glaſs on the ſaid open receiver, which, when the air is a little exhauſted, will be broke into pieces by the weight of the air. 8. A bladder tied over the ſame glaſs will be ſoon broken in the ſame manner.

The ſpring of the air may likewiſe be demonſtrated by various experiments; and it is owing to the preſſure and ſpring of this fluid conjointly, that the great action of human life, we mean inſpiration and expiration, are performed.

Air is alſo a principal cauſe of the vegetation of plants, an inſtance of which we have from Mr. Ray, in the Philoſophical Tranſactions, of lettuce-ſeed that was ſown in the glaſs-receiver of the air-pump, which was exhauſted and cleared from all air, which grew not at all in eight days time; whereas ſome of the ſame ſeed that was ſown at the ſame time, in the open air, was riſen to the height of an inch and an half in that time; but, the air being let into the exhauſted receiver, the ſeed grew up to the height of two or three inches in the ſpace of one week.

Another inſtance of the uſefulneſs of the air in vegetation, is the ſedum, which will puſh out roots without earth and water, and live for ſeveral months: and ſome ſort of aloes, if hung up in a room entirely ſecured from froſts, will remain freſh for ſome years, though they will ſenſibly loſe in their weight.

Air is capable of penetrating the porous and ſpongy parts of plants, and of being there contracted, and of dilating itſelf again.

The air operates alſo within the bowels of the earth, and, by its ſubtility, perſpiring through the pores, aſſiſts in the rarefaction of the crudities of the earth, and in the diſpelling all ſuperfluous moiſture, entering into the very pores and veins of the trees, plants, herbs, &c. carrying along with it thoſe ſalts contained either in itſelf, or lodged in the earth; which ſalts or juices are altered according to the figures or dimenſions of the different ſtrainers or veſſels of thoſe ſeveral plants which grow upon the ſame ſpot of earth, which is ſo impregnated with theſe ſalts: and thence thoſe varieties in taſte and ſmell proceed, notwithſtanding they all receive their nouriſhment from the ſame ſtock that is lodged in the earth.

The air alſo affects the branches, leaves, and flowers of trees, plants, and herbs, entering and perſpiring through them, and even through the bark and body of trees; and by the ſame kind of ſubtility, it does, by its refreſhing breezes, moderate the intenſeneſs of the ſun-beams, cooling, chearing, blowing, opening, and extending all the off-ſpring of nature. The air fixes and inſinuates its aerial ſubſtance into the liquid ſap of vegetables; and, as all the agitations in nature proceed from the contrariety of parts inhabiting together, ſo theſe aerial and liquid ſubſtances being mixed, cauſe the agitation and motion in vegetables, or, more properly, ſet it all into a ferment, whether it be in the roots or in the ſtem; and it riſes by co-operation of the ſun, which is the third agent in vegetation, up to the top of a tree, &c. as liquids riſe by fire to the top of a containing veſſel.

The air we find produces a vibratory motion in ſeveral bodies, and particularly in plants, the air-veſſels thereof perform the office of lungs: for the air contained in them, ſometimes contracting, and ſometimes expanding, according as the heat is increaſed or diminiſhed, preſſes the veſſels, and eaſes them again by turns; and thus promotes a circulation of their juices, which could ſcarce be otherwiſe effected.

Air, ſays the learned Dr. Hales, is a fine elaſtic fluid, with particles of very different natures floating in it, whereby it is admirably fitted by the great Author of nature to be the breath or life of vegetables, as well as animals, without which they can no more live nor thrive than animals can. As a proof of the great quantities of air in vegetables, he refers to his third chapter of his excellent Treatiſe of Vegetable Statics, where, he ſays, in the experiments on vines, the great quantity of air was viſible, which was continually aſcending through the ſap in the tubes; which manifeſtly ſhews what plenty of it is taken in by vegetables, and is perſpired off with the ſap through the leaves.

He adds ſeveral experiments, as to an apple-branch, apricot-branch, birch, and other plants, to prove the ſame thing.

And Dr. Grew has obſerved, that the pores are ſo large in the trunks of ſome plants, as in the better ſort of thick walking canes, that they are viſible to a good eye without a glaſs; but, with a glaſs, the cane ſeems as if ſtuck at top full of holes, with great pins, ſo large as very well to reſemble the pores of the ſkin in the ends of the fingers, and ball of the hand.

In the leaves of vines they likewiſe, through a glaſs, make a very elegant ſhew, ſtanding almoſt exactly in rank and file through the length of the leaves: whence it may be thought probable that the air freely enters plants, not only with the principal fund of nouriſhment by the roots, but alſo through the ſurface of their trunks and leaves, eſpecially at night, when they are changed from a perſpiring to a ſtrongly imbibing ſtate.

Dr. Hales likewiſe tells us, that, in all thoſe experiments he tried to this purpoſe, he found that the air entered very ſlowly at the bark of young ſhoots and branches, but much more freely through old bark; and that in different kinds of trees it had different degrees of more or leſs free entrance.

And likewiſe, that there is ſome air, both in an elaſtic and unelaſtic ſtate, mixed with the earth, (which may well enter the roots with the nouriſhment), he found by ſeveral experiments, which he gives us in the above-mentioned treatiſe.

The excellent Mr. Boyle, in making many experiments on the air, among other diſcoveries, found that a good quantity of air was produceable from vegetables, by putting grapes, plums, gooſeberries, peaſe, and ſeveral other ſorts of fruits and grain, into exhauſted and unexhauſted receivers, where they continued for ſeveral days emitting great quantities of air.

This put the curious Dr. Hales upon further reſearches to find out what proportion of air he could obtain out of the vegetables in which it was lodged and incorporated: this he performed by divers chymico-ſtatical experiments, which he gives in many inſtances, in his Treatiſe of the Analyſis of the Air, plainly ſhewing in what manner he performed them.

One of which was by diſtillation; another by fermentation. That by diſtillation is as follows: the matter to be diſtilled is put into the retort *r*, (plate IV. *fig.* 1.) and then at *a* is cemented very faſt the glaſs veſſel *a b*, which was very capacious at *b*, and had an aperture *c d*, or hole at the bottom. The bolt-head *a b* being immerſed in water, with one leg of an inverted ſyphon put up as far as z, the water would riſe in the bolt-head, and drive out the air through the ſyphon, which being taken out, the water will remain in the veſſel to the part z: at the ſame time, while the bolt-head is under water, it is placed in the veſſel *x x*, which, with the bolt-head and retort, is carried to the chymical furnace, where the retort has the heat and fire gradually communicated to it, and the bolt-head *a b*, and veſſel *x x*, well ſkreened from the heat of the fire.

As the matter diſtilled, all, except the air, would go down into the water of the bolt-head and veſſel, the air that was generated or deſtroyed by the proceſs, would be ſhewn by cauſing the ſurface of the water in the bolt-head to ſtand below or above the point z, as at *y*, when all was ſet aſide till it became quite cold. Thus, if the body diſtilling generates air of an elaſtic quality, that added to the former will not permit the water *y* to riſe ſo high as z, and the ſpace between z and *y* below will ſhew how much air was produced from its fixed ſtate.

But if, when all is cold, the ſurface of the water *y* be ſeen above the point z, it then ſhews that the diſtilled body did deſtroy, that is, imbibe or abſorb, a part of the natural air above z; and the ſpace between z and *y*, filled with water, will ſhew what quantity was changed from a repellent elaſtic to a fixed ſtate, by the ſtrong attraction of the abſorbing particles of the diſtilled body. This quantity of generated or abſorbed air it is eaſy to meaſure in cubic inches, by ſtopping the end of the bolt-head with a cork, and then from a quantity of water of a known weight, to fill it firſt to z, and afterwards to *y*; and the difference of weight in the two bulks of water gives the number of cubic inches, from a table of ſpecific gravities.

The other method which the doctor made uſe of for eſtimating the ſurpriſing effects of fermentation, from various mixtures of ſolid and fluid ſubſtances in generating and abſorbing air, was as follows: he put the ingredients into the bolt-head *b*, (*fig.* 2.) and then run the long neck thereof into a tall cylindric glaſs *a y*, and inclining both almoſt horizontally, in a large veſſel of water, the water ran into the veſſel *a y*, and, driving out part of the air, would poſſeſs its place upon turning them up, and placing both in a veſſel of water *x x*, as you ſee in the figure, where the ſurface of the water ſtands in the inverted glaſs *a y* at the point z.

If the ingredients generated air, then the water would fall from z to *y*, and the empty ſpace z *y* was equal to the quantity of generated air; but if, on fermentation, they abſorbed or fixed the active particles of air, then the ſurface of the water would aſcend from z to *n*; and the cylinder z *n* would be the bulk of air abſorbed, which is eaſily known in cubic inches.

When the ſubjects for trying theſe experiments were a burning candle, burning brimſtone, nitre, gun-powder fired, living animals, &c. the Doctor uſed to make uſe of a pedeſtal, on the top of which was a plate, whereon he laid the matter to be fired; then inverting the tall cylindric glaſs over it, and drawing the water up to z z (*fig.* 3.) with an inverted ſyphon, he ſet fire to the matters lying on the plate, by means of a burning glaſs, concentering the ſun's rays in its focus upon the ſame. See the *figure*.

But the beſt way is, inſtead of having the cylindric glaſs cloſe upon the top of *b b*, to have it open by a ſmall neck, on which a braſs cap is cemented with a female-ſcrew to receive a ſtop-cock, to take off the communication of the external air, when occaſion requires. Thus the uſe and trouble of the ſyphon is ſuperſeded; and in caſe of noxious fumes, vapours, &c. from aquafortis, burning brimſtone, &c. a ſyringe ſcrewed on to the ſtop-cock will draw off the air, and raiſe the water to what height you pleaſe, without the cumberſome uſe of a large pair of bellows, as the doctor made uſe of.

From half a cubic inch, or 135 grains of heart of oak, freſh cut from a growing tree, he found there were 108 cubic inches of air generated, which is a quantity equal to 216 times the bulk of the piece of oak; that the weight of it was above 30 grains, one quarter part of the weight of 135 grains.

And he adds, that he took the like quantity of thin ſhavings from the ſame piece of oak, and dried them at ſome diſtance from a gentle fire, for 24 hours; in which time they evaporated 44 grains of moiſture; which 44 grains being deducted from 135 grains, there remain 91 grains for the ſolid part of the oak: then 30 grains will be one-third of the weight of the ſolid part of the oak.

He gives us another experiment of Indian wheat, which grew in his own garden: he took 388 grains of it, when it was not come into its full maturity, and there were generated from it 270 cubic inches of air; the weight of which air was 77 grains, viz. one-fourth of the whole weight of the wheat.

He alſo found that a cubic inch, or 318 grains, of peaſe generated 396 cubic inches of air, or 113 grains, i. e. ſomething more than one third of the weight of the peaſe.

And again; that from one ounce, or 437 grains, of muſtard ſeed, 270 cubic inches of air were generated, or 77 grains, which is more than one-ſixth part of the ounce weight.

He likewiſe adds, that thete is a great plenty of air incorporated into the ſubſtance of vegetables, which, by the action of fermentation, is rouzed into an elaſtic ſtate, as is evident from theſe experiments following.

On the ſecond day of March he poured 42 cubic inches of ale from the tun, which had been there ſet to ferment 34 hours before, into a bolt-head; and from that time, to the 9th of June, it generated 639 cubic inches of air, with a very unequal progreſſion, more or leſs, as the weather was warm, cool, or cold; and ſometimes, upon a change from warm to cool, it reſorbed air, in all 32 cubic inches.

From the ſecond of March to the 16th of April, 12 cubic inches of Malaga raiſins, with 18 cubic inches of water, generated 411 cubic inches of air; and then, again, it reſorbed 35 cubic inches in two or three cold days. From the 21ſt of April, to the 16th of May, it generated 78 cubic inches; after which, the 9th of June, it continued in a reſorbing ſtate, ſo as to reſorb 13 cubic inches: that there were at that ſeaſon many hot days, with much thunder and lightning, which deſtroy the elaſticity of the air: there were generated in all 489 cubic inches, of which 48 were abſorbed. The liquor was at laſt vapid.

On the 10th of Auguſt, 26 cubic inches of apples being maſhed, they generated 986 cubic inches of air in 13 days time, which is a quantiny equal to 48 times their bulk; after which they reſorbed a quantity equal to their bulk, in three or four days, notwithſtanding the weather was then very hot; after which time they were ſtationary for many days, neither generating nor abſorbing.

From the abovementioned experiments on raiſins and ale, the ingenious author concludes, that wine and ale do not turn vapid in warm weather, by imbibing the air, but by fermenting and generating too much; by which means they are deprived of their enlivening principle, the air: for which reaſon, theſe liquors are beſt preſerved in cool cellars, whereby this active invigorating principle is kept within due bounds, which, when they exceed, wines are upon the fret, and are in danger of being ſpoiled. Upon theſe, and many other experiments, which the learned author has given in his aforeſaid treatiſe, he obſerves, that the air, which ariſes in ſo great quantities from fermenting and diſſolving vegetables, is true permanent air; which is certain, by its continuing in the ſame expanded and elaſtic ſtate for many weeks and months, which expanded watery vapours will not do, but ſoon condenſe when cold.

Upon the whole, he concludes, that air abounds in vegetable ſubſtances, and bears a conſiderable part in them: and, if all the parts of matter were only endowed with a ſtrongly attracting power, all nature would then immediately become one inactive cohering lump.

Wherefore it was abſolutely neceſſary, in order to the actuating this vaſt maſs of attracting matter, that there ſhould be every where mixed with it a due proportion of ſtrongly repelling elaſtic particles, which might enliven the whole maſs by the inceſſant action between them and the attracting particles.

And ſince theſe elaſtic particles are continually in great abundance reduced by the power of the ſtrong attracters, from an elaſtic to a fixed ſtate, it was therefore neceſſary that theſe particles ſhould be indued with a property of reſuming their elaſtic ſtate, whenever they were diſengaged from that maſs in which they were fixed, that thereby this beautiful frame of things might be maintained in a continual round of the production and diſſolution of vegetable, as well as animal, bodies.

The air is very inſtrumental in the production and growth of vegetables, both by invigorating their ſeveral juices, while in an elaſtic active ſtate; and alſo by greatly contributing, in a fixed ſtate, to the union and firm connection of the ſeveral conſtituent parts of thoſe bodies, viz. their water, fire, ſalt, and earth.

In ſhort, the air before mentioned, is very ſerviceable to vegetables, in that it blows up and breaks open the clouds, whoſe treaſures of rain nouriſh the vegetable tribe.

The air alſo helps to waft or diſperſe thoſe foggy humid vapours which ariſe from the ſoil, and would otherwiſe ſtagnate and poiſon the whole face of the earth.

The air, by the aſſiſtance of the ſun, aſſumes and ſublimates thoſe vapours into the upper regions; and thoſe foggy humid vapours are, by this ſublimation, and the coercive power of the air and ſun, rarefied, and made again uſeful in vegetation.

And, on the contrary, to the benign quality of the air, which is ſo many ways ſubſervient to vegetables, it is alſo ſometimes, and upon ſome accounts, injurious and pernicious to them; not only to the ligneous, herbaceous, and flowery parts above, but alſo to the roots and fibres below: for, becauſe the air penetrates into the earth, it is eaſy to be concluded, that a dry, huſky, ſcorching air, may be very prejudicial to the tender fibres of new planted trees.

It may be likewiſe ſuppoſed, that all bodies of earth are more or leſs capable of imbibing the fluid air, and of attracting ſuch ſalts as either can give, or the earth is capable of receiving.

In chemiſtry, it is by no means indifferent whether the proceſs be made in the air or out of it, whether in a confined or open air. Thus camphire, burnt in a cloſe-ſtopped veſſel, goes all into ſalts; inſtead of which, during the proceſs, if you open the veſſel and approach it with a wax taper, it all diſſipates into ſmoke. In like manner, to make ſulphur inflammable, there muſt be an open air. In a cloſe cucurbit, you may ſublimate it even a thouſand times without its taking fire. If ſulphur be put under a bell glaſs, with fire underneath it, a ſpirit of ſulphur will ariſe; but, if there be the leaſt crack in the glaſs, to permit a communication between the interior and exterior air, the ſulphur will immediately take fire. An ounce of charcoal, incloſed in a well-luted crucible, will remain there, without decay, fourteen or fifteen days in the middle of a furnace with a ſtrong fire; though in open air, the thouſandth part of fire would have reduced it into aſhes in a minute. Van Helmont even adds, that all this time the charcoal keeps its black colour; but, on the intermiſſion of a little air, it immediately changes into white aſhes. The ſame thing may be ſaid of all animal and vegetable ſubſtances, which can only be calcined in open fire; but in ſtopped veſſels can only be reduced to black coals.

The air can effect infinite mutations in ſubſtances, not only with regard to its mechanical properties, as gravity, denſity, &c. but alſo on account of the heterogeneous parts which enter into all ſubſtances; as, for example, where there is a great many, the air is impregnated with a biting vitriolic ſalt, which deſtroys every thing on the earth round about, and frequently appears on the ſurface of the ground in a kind of whitiſh efflореſcence.

At Fohlun, in Sweden, a town famous for its copper mines, which have procured it the name of Copperburg, the mineral exhalations affect the air ſo ſenſibly, that the ſilver and copper money people carry in their pockets, changes colour by the means of it: and Mr. Boyle was informed, by a gentleman of property in thoſe parts, that from the veins of metals and minerals, frequent in that country, columns of a kind of ſmoke or ſteam frequently ariſe, ſome of which had a very bad ſcent, others none at all, and ſome an agreeable one. In Carniole and other places, where there are mines, the air is at ſome ſeaſons very unhealthy, from whence proceed ſeveral epidemical diſtempers. We ſhall add, that, about the Cape of Good Hope, the mines of arſenic, which are numerous in

Fig.1. Air Gun.

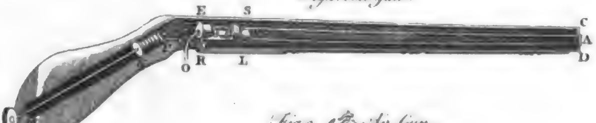


Fig.2. Air Gun.

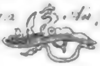


Fig.3. Magazine Air Gun.

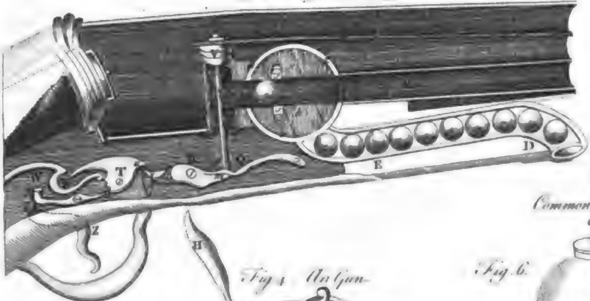


Fig.4. Air Gun.

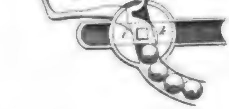
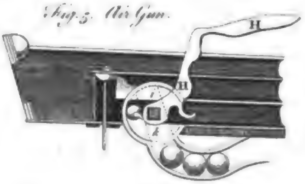


Fig.5. Air Gun.



Common Air Pump

Fig.6.

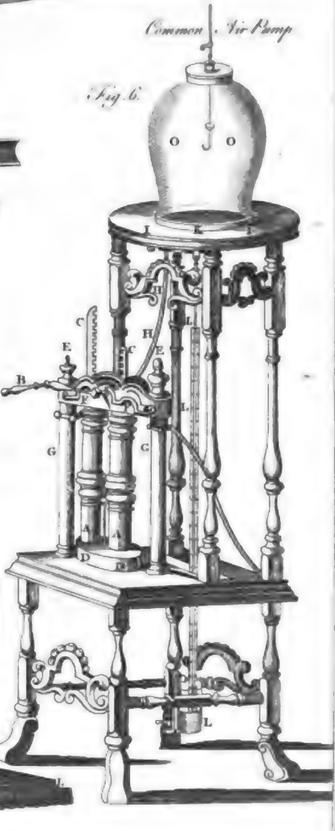

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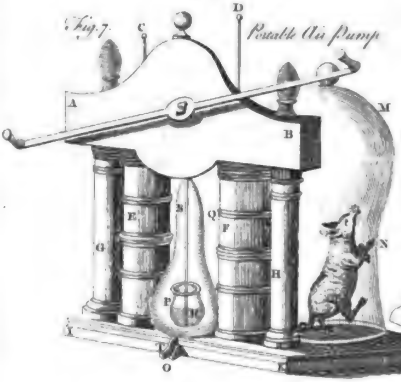
Fig.7. Portable Air Pump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that neighbourhood, emit ſuch noxious vapours, that no animal can live, and they were therefore obliged to ſhut them up again, after having been opened for ſome time.

Dr. Hales has lately contrived a machine, which he calls a ventulator, for evacuating foul air. See the article VENTULATOR.

We are not yet ſufficiently acquainted of what importance it is, that the air we breathe ſhould be pure and free from all mixture of nauſeous and offenſive particles; but, if ſuch a quality of air is ſo much to be deſired by every body, how much more eſſentially neceſſary is it for thoſe whom ſickneſs has made ſuſceptible of every external impreſſion, and thoſe who, pent up in a ſhip, during the courſe of a long voyage, are obliged to live between decks, and are forced to hard labour in different places of the lower parts of the veſſel, which receive very little air from without, and where it is always motionleſs, and, as it were, ſtagnated.

What renders this ſtill more deplorable, is, thoſe very places into which we would chooſe to have pure air, are in general filled with the contrary: the air of hoſpital-rooms is almoſt always mixed with the vapours that continually exhale from the bodies of the ſick, their cloſe-ſtools, and the different remedies adminiſtered to them: the terrible ſickneſſes ſome people of the ſtrongeſt conſtitutions have been attacked with, on their entering into theſe places at firſt, are a proof, paſt contradiction, of the impurity of the air, and its effects.

The ſame thing happens in ſhips, where the exhalations that ariſe from the proviſions, from the pores of the men and living creatures on board, produce effects nearly like to thoſe obſerved in hoſpitals.

In order to prevent the accidents which air, mixed with theſe noxious vapours, may occaſion more certainly, it will be right, firſt, to examine into the nature of theſe vapours. The leaſt attention will convince us they are almoſt entirely volatile; we muſt conclude, therefore, they will always naturally riſe toward the cieling of the rooms, and this motion, upward, muſt be increaſed by the motion of the air, which aſcends in proportion to its rarefaction.

If this propoſition wanted proof, it is eaſy to demonſtrate it: only raiſe a ladder againſt the wall of a room in an hoſpital, and you will find, as you advance towards the cieling, the ſmell, which you could ſupport below, grow continually more offenſive, and the air hotter; this being admitted, it will be eaſy to let out the foul air, and introduce freſh, only by placing windows cloſe under the cieling, and leaving the top ſquares always open; for the hot and putrified air would continually go off, and a circulation of freſh air be promoted every moment.

The ſame effect might be produced by erecting a cupola, or dome, at each extremity of a ward in an hoſpital; the air would naturally be drawn to them, and paſs off by them: this has been practiſed at Lyons, with ſo much ſucceſs, that you can ſcarce perceive any ſmell at all in the hoſpital; but, if you ſhould go on the inſide of the cupola, the ſtench is inſufferable.

AIR, in medicine, makes one, and not the leaſt powerful, of the non-naturals; as upon it the very life of animals depends.

It is ſuſceptible of different qualities; hot, moiſt, cold, dry, ſerene, pure, and temperate. It is ſubject to variations, more or leſs ſudden, and to be mixed with impure, corrupted, contagious, metallic, ſulphureous exhalations, which are all prejudicial to health. The beſt quality of the air is to be pure and ſweet, void of all bad exhalations, neither too hot, cold, dry, nor moiſt.

The ſudden changes of the air are inevitable and dangerous; whence proceed a great number of diſeaſes, which reign in the ſpring and autumn, towards the approach of winter. Hoſpitals, camps, places where lead is melted, and the earth juſt thrown up, are generally unhealthy, on account of the bad exhalations. Lighted charcoal, in a cloſe place, fills the air with ſulphureous particles, which are unwholeſome, and ſometimes kill the ſtrongeſt perſons.

Too hot an air diſpoſes to malignant fevers; if it be without moiſture, it produces diary and putrid fevers. Agues are epidemic in the fens of Cambridgeſhire, the hundreds of Eſſex, and in ſome parts of Kent, on account of the vapours, which weaken the fibres of the body, and obſtruct the pores of the ſkin; beſides, a cold and moiſt conſtitution of the air produces coughs, diſtillations, and rheumatic pains.

Hectic and conſumptive people are in great danger, both in very hot and in very cold weather. When the paſſage through the pores of the ſkin is ſtopt by cold, the patient is either apt to fall into a looſeneſs, or to have his legs ſwelled, and the aſthmatic ſymptoms increaſed.

AIR, in mythology, was worſhipped by the pagans, under the names of Jupiter and Juno; the former repreſenting the ſuperior and finer part of the atmoſphere, and the latter the inferior and groſſer part.

AIR, in painting and ſculpture, denotes the manner and very life of action; or, it is that which expreſſes the diſpoſition of the agent. See ACTION.

Some uſe the word to ſignify the geſture or attitude of a figure.

AIR, in muſic, implies the melody proper for ſongs, odes, &c. being uſually quick and lively.

The term is ſometimes uſed to ſignify the ſongs themſelves, called by the Romans, *aerá*, whence the word in this acceptation is derived.

AIRS, in the manege, ſignify the artificial motions of taught or maneged horſes; ſuch as the demi-volt, curvet, capriole, &c.

Some extend the term to the natural paces of a horſe; as walking, trotting, galloping; but this is not a proper application of the word, and is accordingly never uſed in the latter ſenſe by the beſt writers.

AIR-BLADDER, a veſicle found in the bodies of all fiſhes, except thoſe of the cartilaginous and cetaceous kinds. It is vulgarly called the ſwim, or ſwimming bladder.

By the aſſiſtance of this bladder, which is always more or leſs replete with air, the fiſh is enabled to ſuſtain its body at any depth. When the fiſh is near the bottom, the great weight of the incumbent water compreſſes its body, or rather the incloſed air-bladder, till the whole fiſh becomes equiponderant with an equal bulk of water. In the middle of fluid, where the preſſure is leſs, the air-bladder expands; thereby increaſes the bulk of the fiſh, without adding any thing to its weight, till it here alſo becomes equiponderant with an equal bulk of water; and in this manner the air-bladder expands, as the fiſh riſes nearer the ſurface, and by that means ſuſtains it at any depth.

There is however no doubt but fiſhes have a power of expanding and compreſſing the air-bladder, excluſive of the weight of the water, and by that means of riſing or ſinking at pleaſure.

Some fiſhes have only a ſingle air-bladder; ſome a double one; and in others it is triple, or divided into three cells. Fiſhes which lie grovelling at the bottom, have no air-bladders; and it is remarkable, that if the air-bladder be either pricked or burſt, in fiſhes naturally furniſhed with it, they immediately ſink to the bottom; from whence they can never raiſe themſelves.

AIR-GUN, a pneumatic machine for exploding bullets, &c. with great violence.

The common air-gun is made of braſs, and has two barrels; the inſide barrel A (pl. II. *fig.* 1.) is of a ſmall bore, from whence the bullets are exploded; and a large barrel E C D R on the outſide of it. There is a ſyringe S M N P fixed in the ſtock of the gun, by which the air is injected into the cavity between the two barrels thro' the valve E P. The ball K is put down into its place in the ſmall barrel, with the rammer, as in another gun. At S L is another valve, which, being opened by the trigger O, permits the air to come behind the bullet, ſo as to drive it out with great force. If this valve be opened and ſhut ſuddenly, one charge of condenſed air may be ſufficient for ſeveral diſcharges of bullets; but if the whole air be diſcharged on one ſingle bullet, it will drive it out with a great force. This diſcharge is effected by means of a lock (*fig.* 2.) placed here as uſual in other guns; for the trigger being pulled, the cock will go down and drive the lever O (*fig.* 1.) which will open the valve, and let in the air upon the bullet K.

The magazine air-gun is the invention of that ingenious artiſt L. Colbe. By this contrivance ten bullets are ſo lodged in a cavity, near the place of diſcharge, that they may be drawn into the ſhooting barrel, and ſucceſſively diſcharged ſo faſt as to be nearly of the ſame uſe as ſo many different guns.

Fig. 3. repreſents the preſent form of this machine, where part of the ſtock is cut off, to the end of the injecting ſyringe. It has its valve opening into the cavity between the barrels, as before. K K is the ſmall ſhooting-barrel, which receives the bullets from the magazine E D, which is of a ſerpentine form, and cloſed at the end D, when the bullets are lodged in it. The circular part *ſ* I *ſ k* M *i*, is the key of a cock, having a cylindric hole through it I K, which is equal to the bore of the ſame barrel, and makes a part of it in the preſent ſituation. When the lock is taken off, the ſeveral parts Q, R, T, W, &c. come into view, by which means the diſcharge is made by puſhing up the pin P *p*, which raiſes and opens a valve V, to let in the air againſt the bullet I, from the cavity F, F, F; which valve is immediately ſhut down again by means of a long ſpring of braſs N. This valve V being a conical piece of braſs, ground very true in the part which receives it, will of itſelf be ſufficient to confine the air.

To make a diſcharge, you will pull the trigger Z Z, which throws up the ſeer *y x*, and diſengages it from the notch *x*, upon which the ſtrong ſpring W W moves the tumbler T, to which the cock is fixed. This, by its end *u*, bears down the end *v* of the tumbling lever R, which, by the other end *m*, raiſes at the ſame time the flat end *l* of the horizontal lever Q; and by this means, of courſe, the pin P *p* is puſhed up, which ſtands upon it, and thus opens the valve V, and diſcharges the bullet. This is all evident from a bare view of the figure.

To bring another bullet to ſucceed that marked I, inſtantaneouſly, turn the cylindric cavity of the key of the cock, which before made part of the barrel K K K, into the ſituation *i k*, ſo that the part I may be at K, and holding the gun upon your ſhoulder, with the barrel downwards, and the magazine upwards, by which means that bullet next the cock, will fall into it out of the magazine, but go no farther into this cylindric cavity than the two little ſprings *ſ ſ*, which detains it. The two circles repreſent the cock barrel, wherein the key abovementioned turns upon an axis not repreſented here, but viſible in *fig.* 4. This axis is a ſquare piece of ſteel, on which comes the ſquare hole of the hammer H; by which the cylindric cavity mentioned is opened to the magazine. Then opening the hammer, as in *fig.* 5. the bullet is brought into its proper place near the diſcharge valve, and the cylindric cavity of the key of the cock again makes part of the inward barrel K K K.

It evidently appears how expeditious a method this is of charging and diſcharging a gun, and were the force of condenſed air equal to that of gun-powder, ſuch an air-gun would anſwer the end of ſeveral guns.

In the air-gun, and all other caſes where the air is required to be condenſed to a very great degree, it will be requiſite to have the ſyringe of a ſmall bore, viz. not exceeding half an inch in diameter; becauſe the preſſure againſt every ſquare inch is about 15 pounds, and therefore againſt every circular inch about 12 pounds. If therefore the ſyringe be one inch in diameter, when one atmoſphere is injected, there will be a reſiſtance of 12 pounds againſt the piſton; and when ten are injected, there will be a force of 120 pounds to be overcome; whereas ten atmoſpheres act againſt the circular half-inch piſton (whoſe area is only one fourth part ſo big) with only a force equal to 30 pounds; or 40 atmoſpheres may be injected with ſuch a ſyringe as well as 10 with the other. In ſhort, the facility of working will be inverſely, as the ſquares of the diameter of the ſyringe.

Air-Jacket, a ſort of jacket made of leather, in which are ſeveral bags, or bladders, compoſed of the ſame materials, communicating with each other. Theſe are filled with air through a leather tube, having a braſs ſtop-cock accurately ground at the extremity, by which means the air blown in through the tube is confined in the bladders. The jacket muſt be wet, before the air be blown into the bags, as otherwiſe it will immediately eſcape through the pores of the leather. By the help of theſe bladders, which are placed near the breaſt, the perſon is ſupported in the water, without making the efforts uſed in ſwimming; and conſequently may ſave himſelf, if he has the misfortune of falling over-board, &c. See the article Cork-Jacket, where the reader will find a compariſon between theſe two inventions.

Air-Pump, a pneumatic machine, by which the air contained in a proper veſſel may be exhauſted.

The inventor of this noble inſtrument was the celebrated Otto de Geurick, a burgomaſter of Magdeburg, who performed ſeveral experiments on it at Ratiſbon, before the emperor and ſeveral other perſons of diſtinction, in the year 1654. But this inſtrument was very defective, it requiring the labour of two ſtrong men, for above two hours, to exhauſt the air out of glaſs-veſſels, plunged under water. Some time after Mr. Boyle, with the aſſiſtance of Dr. Hook, contrived a new air-pump, more commodious and better adapted to experiments than that of the German author, and hence, the inſtrument was called Machina Boyleana.

Several ſorts of air-pumps have been from time to time conſtructed, and ſeveral improvements made in this uſeful machine at different times and by different perſons. The following, which is generally in uſe, was publiſhed by Mr. Hawkſbee, in the year 1709.

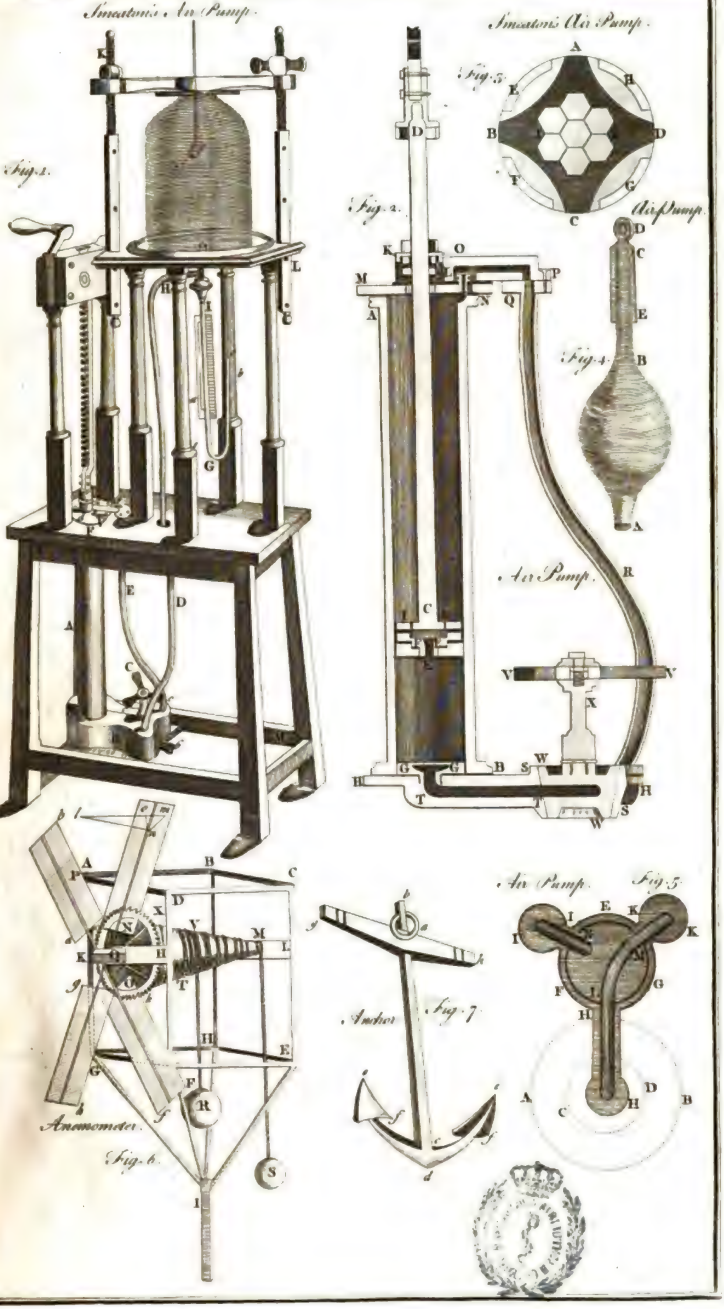
Deſcription of the common Air-Pump. This machine is repreſented on plate II. *fig.* 6. where A, A, are two braſs barrels, in which the piſtons C, C, move up and down by means of a cog wheel, which moves on the axis F, when the machine is put in motion by the winch B. G, G, are two pillars, or pieces of wood, ſupporting the frame of the pump-wheel, which is ſcrewed upon them by nuts under the little pieces of wood E, E. The braſs tube, or pipe, marked H, H, is called the ſwan-neck; by this the air paſſes from under the receiver O, O, through a ſmall hole K, in the middle of the braſs plate I, I, on the top of the pump to a braſs piece in the box D, D, which being perforated lengthways, to the middle point, under each barrel, tranſmits the air through a ſmall hole by a bladder valve, from the receiver to each barrel, to be pumped out by paſſing through the hole in the deſcending piſton. Theſe holes in the piſtons, and bottoms of the barrels, are covered with valves to prevent the return of the air into the receiver. The mercurial gauge, or common barometer, marked L, L, is immerſed in a baſon of mercury, fixed in the bottom of the frame, and at the top communicates with the receiver, and conſequently ſhews how much the receiver is exhauſted by the riſing of the mercury in the tube, by a graduated ſcale fixed to it. Under the frame, below K, is a ſtop-cock communicating with the receiver, by turning which the air will be re-admitted. The receiver is ground very true at the bottom, and fixed on the pump by means of wetted leathers, by which means the air is effectually excluded.

Deſcription of a portable Air-Pump. This pump is repreſented on plate II. *fig.* 7, where A, B, is the head, or part containing the wheel, which alternately riſes and depreſſes the piſtons C, D, in the barrels E F, which are ſtrongly preſſed down by the ſaid part A, B, ſupported by the two pillars G, H, fixed into the bed or bottom I, K, L, of the machine. On this bottom ſtands the receiver M, N, on a large, ſmooth, braſs plate, in the middle of which is a hole, by which the air paſſes out of the receiver into a ſmall tube on the under part of the frame, and goes to the piece O, which communicates with the perforated braſs piece on which the barrels ſtand, and from which they receive the air to be exhauſted: on the middle part of this braſs piece is a perforation, over which is placed a ſmall receiver P, Q, and under it a baſon of mercury R, in which a ſmall tube R, S, hermetically ſealed at one end, and filled with quickſilver, is inverted; and conſequently, as the ſmall receiver P Q is exhauſted, together with the large one M, N, the approach of the vacuum will be indicated by the deſcent of the quickſilver in the tube R, S. By means of a ſtop-cock at T, the air is again let into the receiver.

Deſcription of Mr. Smeaton's Air-Pump. This ingenious gentleman has not only obliged the world with an air-pump, far preferable to any machine of that kind

hitherto

PLATE III. Facing Air-Pump


Smeaton's Air Pump.
Fig. 1.
K
L
G
H
I
E
D
A
C
M
Smeaton's Air Pump.
Fig. 3.
A
H
E
B
D
F
G
C
Fig. 2.
K
O
M
P
N
Q
A
D
C
R
V
X
W
S
B
G
H
T
Air Pump.
Fig. 4.
D
C
E
B
A
Air Pump.
Air Pump.
Fig. 5.
E
K
I
M
F
G
L
H
A
C
D
B
p
l
e
m
A
B
C
P
D
X
N
V
M
K
H
L
O
T
G
E
F
R
S
I
Anemometer.
Fig. 6.
Anchor
Fig. 7.
b
a
g
h
i
f
c
d

hitherto known; but alſo ſhewn the reaſons on which the imperfections of the common air-pump depend. The reader will therefore, we are perſuaded, be pleaſed to ſee Mr. Smeaton's obſervations in his own words.

“ The principal cauſes of imperfection in the common pumps ariſe, firſt, from the difficulty in opening the valves at the bottom of the barrels, and, ſecondly, from the piſton's not fitting exactly, when put cloſe down to the bottom, which leaves a lodgment for air, that is not got out of the barrel, and proves of bad effect.

“ In regard to the firſt of theſe cauſes, the valves of air-pumps are commonly made of a bit of thin bladder, ſtretched over a hole generally much leſs than one tenth of an inch diameter; and to prevent the air from repaſſing between the bladder and the plate, upon which it is ſpread, the valve muſt always be kept moiſt with oil or water.

“ It is well known, that at each ſtroke of the pump the air is more and more rarefied, in a certain progreſſion, which would be ſuch, that an equal proportion of the remainder would be taken away, was is not affected by the impediments I have mentioned: ſo that, when the ſpring of the air in the receiver becomes ſo weak, as not to be able to overcome the coheſion of the bladder to the plate, occaſioned by the fluid between them, the weight of the bladder, and the reſiſtance that it makes by being ſtretched, the rarefaction cannot be carried farther, tho' the pump ſhould ſtill continue to be worked.

“ It is evident, the larger the hole is, over which the bladder is laid, a proportionably greater force is exerted upon it by the included air, in order to lift it up; but the aperture of the hole cannot be made very large, becauſe the preſſure of the incumbent air would either burſt the valve, or ſo far force it down into the cavity, as to prevent its lying flat and cloſe upon the plate, which is abſolutely neceſſary.

“ To avoid theſe inconveniences as much as poſſible, inſtead of one hole, I have made uſe of ſeven, all of equal ſize and ſhape; one being in the center, and the other ſix round it: ſo that the valve is ſupported at proper diſtances by a kind of grating, made by the ſolid parts between theſe holes: and to render the points of contact, between the bladder and grating, as few as poſſible, the holes are made hexagonal, and the partitions filed almoſt to an edge. As the whole preſſure of the atmoſphere can never be exerted upon this valve, in the conſtruction made uſe of in this pump; and as the bladder is faſtened in four places inſtead of two, I have made the breadth of the hexagons three tenths of an inch; ſo that the ſurface of each of them is more than nine times greater than common. But as the circumference of each hole is more than three times greater than common, and as the force that holds down the valve, ariſing from coheſion, is, in the firſt moment of the air's exerting its force, proportionable to the circumference of the hole; the valve over any of theſe holes will be raiſed with three times more eaſe than common: but as the raiſing the valve over the center-hole is aſſiſted on all ſides by thoſe placed round it, and as they altogether contribute as much to raiſe the bladder over the center-hole, as the air immediately acting under it; upon this account the valve will be raiſed with double the eaſe that we have before ſuppoſed, or with a ſixth part of the force commonly neceſſary.

“ It is not material to conſider the force of the coheſion, after the firſt inſtant: for, after the bladder begins to riſe, it expoſes a greater ſurface to the air underneath, which makes it move more eaſily. I have not brought into this account, the force that keeps down the valve, that ariſes from the weight of the bladder, and the reſiſtance from its being ſtretched; for I look upon theſe as ſmall in compariſon of the other.

“ I was not, however, contented with this conſtruction of the valves, till I had tried what effect would be produced, when they were opened by the motion of the winch, independent of the ſpring of the air: and though the contrivance I made uſe of ſeemed to me leſs liable to objection than any thing I was acquainted with, that had been deſigned for that purpoſe; yet I did not find it to anſwer the end better than what I have already deſcribed; and therefore laid it aſide, as it rendered the machinery much more complex, and troubleſome to execute.

“ But, ſuppoſing all thoſe difficulties to be abſolutely overcome, the other defect, that I mentioned in the common conſtruction, would hinder the rarefaction from being carried on beyond a certain degree. For, as the piſton cannot be made to fit ſo cloſe to the bottom of the barrel, as totally to exclude all the air, as the piſton riſes, this air will expand itſelf; but ſtill preſſing upon the valve, according to its denſity, hinders the air within the receiver from coming out: hence, were this vacancy to equal the 150th part of the capacity of the whole barrel, no air could ever paſs out of the receiver, when expanded 150 times, though the piſton was conſtantly drawn to the top; becauſe the air in the receiver would be in æquilibrio with that in the barrel, when in its moſt expanded ſtate. This I have endeavoured to overcome, by ſhutting up the top of the barrel with a plate, having in the middle a collar of leathers, through which the cylindrical rod works that carries the piſton. By this means the external air is prevented from preſſing upon the piſton; but that the air that paſſes through the valve of the piſton from below may be diſcharged out of the barrel, there is alſo a valve applied to the plate at the top that opens upwards. The conſequence of this conſtruction is, that, when the piſton is put down to the bottom of the cylinder, the air in the lodgment under the piſton will evacuate itſelf ſo much the more, as the valve of the piſton opens more eaſily, when preſſed by the rarefied air above it, than when preſſed by the whole weight of the atmoſphere. Hence, as the piſton may be made to fit as nearly to the top of the cylinder, as it can to the bottom, the air may be rarefied as much above the piſton as it could before have been in the receiver. It follows, therefore, that the air may now be rarefied in the receiver, in duplicate proportion of what it could be upon the common principle; every thing elſe being ſuppoſed perfect. Another advantage of this conſtruction is, that though the pump is compoſed of a ſingle barrel, yet the preſſure of the outward air being taken off by the upper plate, the piſton is worked with more eaſe than the common pumps with two barrels; and not only ſo, but when a conſiderable degree of rarefaction is deſired, it will do it quicker; for the terms of the ſeries expreſſing the quantity of air taken away at each ſtroke, do not diminiſh ſo faſt as the ſeries anſwering to the common one.

“ I have found the gauges that have been hitherto made uſe of for meaſuring the expanſion of the air, very unfit to determine in an experiment of ſo much nicety. I have therefore contrived one of a different ſort, which meaſures the expanſion with certainty, to much leſs than the 1000th part of the whole. It conſiſts of a bulb of glaſs ſomething in the ſhape of a pear, and ſufficient to hold about half a pound of quickſilver. It is open at one end, and at the other is a tube hermetically cloſed at top. By the help of a nice pair of ſcales, I found what proportion of weight a column of mercury, of a certain length, contained in the tube, bore to that which filled the whole veſſel. By theſe means I was enabled to mark diviſions upon the tube, anſwering to the 1000th part of the whole capacity, which being of about one tenth of an inch each, may, by eſtimation, be eaſily ſubdivided into ſmaller parts. This gauge, during the exhauſting of the receiver, is ſuſpended therein by a ſlip-wire. When the pump is worked as much as ſhall be thought neceſſary, the gauge is puſhed down, till the open end is immerged in a ciſtern of quickſilver placed underneath: the air being then let in, the quickſilver will be driven into the gauge, till the air remaining in it becomes of the ſame denſity with the external; and as the air always takes the higheſt place, the tube being uppermoſt, the expanſion will be determined by the number of diviſions occupied by the air at the top. The degree, to which I have been able to rarefy the air in experiment, has generally been about 1000 times, when the pump is put clean together; but the moiſture that adheres to the inſide of the barrel, as well as other internal parts, upon letting in the air, is in the ſame ſucceeding trials worked together with the oil, which ſoon renders it ſo clammy as to obſtruct the action of the pump upon a fluid ſo ſubtile as the air is, when ſo much expanded; but in this caſe it ſeldom fails to act upon the air in the receiver, till it is expanded 500 times: and this I have found it to do, after being frequently uſed for ſeveral months without cleaning. I have alſo generally found it to perform beſt the firſt trial at each time of uſing, though nothing had been at it from the time preceding; which, after a great many trials made with this view, I alſo attribute to the vapours of the air mixing with the oil. An experiment, where the air was expanded 1000 times, was tried about two years ſince in preſence of the Royal Society; at which were preſent alſo Dr. Knight and Mr. Canton; and I lately did the ſame thing with Mr. Watſon. The pump, which I intend myſelf the honour of ſhewing the ſociety, is the ſame that I juſt now mentioned; and the ſecond that I made, with a view to improve upon this principle.

“ The degree of rareſaction, produced by the beſt of the three pumps, that you procured the trial of, and which you eſteemed good in their kind, and in complete order, never exceeded 140 times, when tried by the gauge before deſcribed.

“ I have alſo endeavoured to render the pneumatic apparatus more ſimple and commodious, by making this air-pump act as a condenſing engine at pleaſure, by ſingly turning a cock. This not only enables us to try any experiments under different circumſtances of preſſure, without changing the apparatus, but renders the pump an univerſal engine, for ſhewing any effect that ariſes from an alteration in the denſity or ſpring of the air. Thus, with a little addition of apparatus, it ſhews the experiments of the air-fountain, wind-gun, &c.

“ This is done in the following manner: the air above the piſton, being forcibly driven out of the barrel at each ſtroke, and having no where to eſcape, but by the valve at the top; if this valve be connected with the receiver, by means of a pipe, and at the ſame time the valve at the bottom, inſtead of communicating with the receiver, be made to communicate with the external air, the pump will then perform as a condenſer.

“ The mechaniſm is thus ordered: there is a cock with three pipes placed round it, at equal diſtances; the key is ſo pierced that any two may be made to communicate, while the other is left open to the external air. One of theſe pipes goes to the valve at the bottom of the barrel, another goes to the valve at the top, and a third goes to the receiver. Thus, when the pipe from the receiver, and that from the bottom of the barrel, are united, the pump exhauſts; but turn the cock round, till the pipe from the receiver, and that from the top of the barrel, communicate, and it then condenſes. The third pipe, in one caſe, diſcharges the air taken from the receiver into the barrel; and, in the other, lets it into the barrel, that it may be forced into the receiver.

“ Plate III. *fig*. 1. is a perſpective view of the principal parts of the pump together. A is the barrel. B the ciſtern, in which are included the cock, with ſeveral joints. Theſe are covered with water to keep them air-tight. A little cock to let the water out of the ciſtern, is marked 6. C*cc* is the triangular handle of the key of the cock; which, by the marks on its arms, ſhews how it muſt be turned, that the pump may produce the effect deſired. D H is the pipe of communication between the cock and the receiver. E is the pipe that communicates between the cock and the valve, on the upper plate of the barrel. F is the upper plate of the pump, which contains the collar of leathers *d*, and V the valve, which is covered by the piece *f*. G I is the ſiphon gauge, which ſcrews on and off, and is adapted to common purpoſes. It conſiſts of a glaſs tube hermetically ſealed at *c*, and furniſhed with quickſilver in each leg; which before the pump begins to work, lies level in the line *a b*; the ſpace *b c* being filled with air of the common denſity. When the pump exhauſts, the air in *b c* expands, and the quickſilver in the oppoſite leg riſes, till it becomes a counter-balance to it. Its uſe is ſhewn upon the ſcale I *c*, by which the expanſion of the air in the receiver may be nearly judged of. When the pump condenſes, the quickſilver riſes in the other leg, and the degree may be nearly judged of by the contraction of the air in *b c*; marks being placed at $\frac{1}{2}$ and $\frac{1}{3}$ of the length to *b c* from *c*, which ſhews when the receiver contains double or treble its common quantity. K L is a ſcrew-frame to hold down the receiver, in condenſing experiments, which takes off at pleaſure; and is ſufficient to hold down a receiver, the diameter of whoſe baſe is ſeven inches, when charged with a treble atmoſphere; in which caſe it acts with a force of about 800 pounds againſt the ſcrew-frame. M is a ſcrew, that faſtens a bolt, which ſlides up and down in that leg, by means whereof the machine is made to ſtand faſt on uneven ground.

“ Fig. 2. is a perpendicular ſection of the barrel and cock, &c. where A B repreſents the barrel. C D the rod of the piſton, which paſſes through M N the plate, which cloſes the top of the barrel. K is the collar of leathers, through which the piſton-rod paſſes. When the piſton is at the bottom of the cylinder, the upper part of K is covered by the cap at D, to keep out duſt, &c. L is the valve on the upper plate, which is covered by the piece O, P, which is connected with the pipe Q, R, which makes the communication between the valve and cock. C, E, is the piſton; and E, F, F, is the piſton valve. I, I, are two little holes to let the air paſs from the piſton valve into the upper part of the barrel. G, G, K, is the principal valve at the bottom of the cylinder. H, H, is a piece of metal, into which the valve G, G, K, is ſcrewed, and cloſes the bottom of the cylinder; out of which alſo is compoſed S, S, the cock, and K, T, T, the ducts from the cock to the bottom of the barrel. W, W, is the key of the cock; X, the ſtem; and V, V, the handle.

“ Fig. 5. is an horizontal ſection of the cock, through the middle of the duct T, T. A, B, repreſents the bigneſs of the circular plate that cloſes the bottom of the barrel. C, D, repreſents the bigneſs of the inſide of the barrel. E, F, G, is the body of the cock; the outward ſhell being pierced with three holes at equal diſtances, and correſponding to the three ducts, H H, I I, K K, whereof H H is the duct that goes to the bottom of the barrel. I I is the duct that communicates with the top of the barrel; and K K is the duct that paſſes from the cock to the receiver. L, M, N, is the key, or ſolid part of the cock, moveable round in the ſhell E F G. When the canal L M anſwers to the ducts H H and K K, the pump exhauſts, and the air is diſcharged by the perforation N. But, the key L, M, N, being turned till the canal L M anſwers to I I and K K, the perforation N will then anſwer to H H; and, in this caſe, the pump condenſes. Laſtly, when N anſwers to K K, the air is then let in or diſcharged from the receiver, as the circumſtance requires.

“ Fig. 3. is the plan of the principal valve. A, B, C, D, repreſents the bladder faſtened in four places, and ſtretched over the ſeven holes I, K, formed into an hexagonal grating, which I ſhall call the honey-comb. E, F, G, H, ſhews where the metal is a little protuberant, to hinder the piſton from ſtriking againſt the bladder.

“ Fig. 4. repreſents the new gauge, which I call the pear gauge. It is open at A; B, C, is the graduated tube, which is hermetically cloſed at C, and is ſuſpended by the piece of braſs D, E, that is hollowed into a cylinder, and claſps the tube.”

Theory of the AIR PUMP. The operations of this machine are accounted for by the elaſticity of the air: for, when the piſton is thruſt down to the bottom of its barrel, and then raiſed up, it is evident that the air, which before was contained in the receiver, will now expand itſelf, and part of it will enter into the pump barrel: ſo that the air in the receiver and barrel will have the ſame denſity; but this denſity is to the former as the capacity of the receiver and barrel in one ſum, is to the capacity of the receiver alone; it being well known that the denſity of the air (in the ſame region) is inverſely as the ſpace occupied. (See DENSITY.) Wherefore, putting d for the denſity of common air, m for the capacity of the receiver, n for that of the pump barrel, we ſhall have $m+n : m :: d : \frac{dm}{m+n}$, the denſity of the air in the receiver after the firſt ſtroke of the piſton; this being obtained, it will be $m+n : m :: \frac{md}{m+n}$ (the laſt found denſity) : $\frac{m^2 d}{m+n^2}$ the denſity of the air in the receiver after the ſecond ſtroke of the piſton: proceed in this manner for any number of ſtrokes; and if s repreſent that number, the denſity of the remaining air in the receiver at the end of s ſtrokes of the piſton, will be expreſſed by $\frac{dm^s}{\overline{m+n}^s}$, that is, in words, The denſity of the natural air in the receiver is to its denſity after any number of ſtrokes of the piſton, as the capacity of the receiver, and that of the barrel in one ſum, raiſed to a power whoſe index is the number of ſtrokes, is to the like power of the capacity of the receiver alone; which is the theorem given by M. Varignon, in the *Memoires de Mathemat. & Phyſ.* for Dec. 1703. If the above expreſſion for the denſity be put equal to r, we ſhall have $\frac{m^s}{\overline{m+n}^s} = \frac{r}{d}$, conſequently, by the nature of logarithms, there will ariſe $s \times \log.\ \overline{m+n} - s \times \log.\ m = \log.\ d - \log.\ r$, which gives the following theorem for finding the ratio of the denſity of the air in its natural ſtate, to that of the air in the receiver, after any number of ſtrokes of the piſton.

Subtract the logarithm of the capacity of the receiver from that of the ſum of the capacity of the receiver and the barrel, then the remainder being multiplied by the number of ſtrokes of the piſton, the product will be a logarithm, whoſe natural number, compared with unity, will ſhew the ratio required.

Thus, if the capacity of the receiver be 460, that of the barrel 580, and the number of ſtrokes of the piſton 6, the primitive air will be found to the remaining air in the ratio of 133 ½ to 1; that is, the remaining air in the receiver, after 6 ſtrokes of the piſton, is above 133 times more rarefied than in its natural ſtate.

If the capacity of the receiver and the barrel were given, and it were required to find the number of ſtrokes of the piſton neceſſary to rarefy the air to a certain degree, then by the above equation we have $s = \frac{\log.\ d. - \log.\ r.}{\log.\ \overline{m+n}. - \log.\ m.}$, that is, in words, Subtract the logarithm of the remaining air from the logarithm of the primitive air; and the logarithm of the capacity of the receiver from that of the aggregate of the capacity of the receiver and barrel; then, dividing the former difference by the latter, the quotient is the number of ſtrokes required.

Thus, if the capacity of the barrel be ſuppoſed 580; that of the receiver 460; and the ratio of the primitive air to the remaining air, as 1335 to 10, the number of ſtrokes required will be found to be 6.

Air-Shafts, among miners, are holes made from the open air to meet the adits, and ſupply them with freſh air.

Theſe air-ſhafts, when the adits are thirty or forty fathoms in length, become abſolutely neceſſary, in order to let in freſh air, and at the ſame time give vent to the damps and noxious vapours.

Air-Threads, in natural hiſtory, a name given to the long filaments, ſo frequently ſeen in autumn floating about in the air.

Theſe threads are the work of ſpiders, eſpecially of that ſpecies called the long-legged field-ſpider; which, having mounted to the ſummit of a buſh or tree, darts from its tail ſeveral of theſe threads, till one is produced capable of ſupporting the creature in the air; on this it mounts in queſt of prey, and frequently riſes to a very conſiderable height.

Nor does the ſpider that has thus raiſed itſelf deſcend always by the ſame thread; it often winds that up, and darts out another, more or leſs long, as the creature intends a higher or lower flight.

Air-Vessels, in plants, are certain veſſels or ducts for imbibing or conveying air to the ſeveral parts of the plant. See **Air**.

AIRIANI, in eccleſiaſtical hiſtory, a branch of the Arians, who beſides the common tenets of that ſect, denied the conſtantiability of the Holy Ghoſt with the Father and Son.

AIRING, in horſemanſhip, implies the exerciſing a horſe in the open air, a practice that cannot be too much commended.

AIRY, or **Aery**, among ſportſmen, implies the neſt of a hawk or eagle.

Airy *Triplicity*, among aſtrologers, denotes the three ſigns Gemini, Libra, and Aquarius.

AISIAMENTA, in law, the ſame with eaſement. See the article **Easement**.

AJUGA, in botany, a name uſed by Linnæus for a genus of plants, called by Tournefort bugula. See **Bugula**.

AIUS LOCUTIUS, the name of a deity to whom the Romans erected an altar.

The words are Latin, and ſignify, "A ſpeaking "voice."

The following accident gave occaſion to the Romans erecting an altar to the Aius Locutius. One M. Ceditius, a plebeian, acquainted the tribunes, that, in walking the ſtreets by night, he had heard a voice over the temple of Veſta, giving the Romans notice that the Gauls were coming againſt them. This intimation was however neglected; but after the truth was confirmed by the event, Camillus acknowledged this voice to be a new deity, and erected an altar to it under the name of the Aius Locutius.

AJUTAGE, or **Adjutage**, in hydraulics, a ſmall pipe fitted to the aperture of a jet-d'eau, or fountain.

Experiments have ſhewn, that a reſervoir of 12 feet height above the orifice of an ajutage of three lines diameter, delivers 14 Paris pints of water in a minute. This may ſerve as a fundamental rule for fountains, aſſiſted by the following principles.

When the height of the reſervoirs is the ſame, and the orifices of the ajutages different, the expence of water is proportional to the ſquares of the diameters of the ajutages, whence the expence of water, through different ajutages, is thus computed. If 9, the ſquare of 3, gives, by experiment, 14 pints, what will an ajutage of 5 or 6 lines give? The anſwer is, 39 pints for 5, and 56 pints for 6. Whence M. Mariotte has computed the following table.

	Feet		Pints
Ajutage	1	— — — — — — —	1 $\frac{1}{2}$
———	2	— — — — — — —	6 $\frac{2}{9}$
———	3	— — — — — — —	14
———	4	— — — — — — —	25
———	5	— — — — — — —	39
———	6	— — — — — — —	56
———	7	— — — — — — —	76 $\frac{1}{4}$
———	8	— — — — — — —	110 $\frac{2}{3}$
———	9	— — — — — — —	126

Here the heights of the reſervoirs are ſuppoſed equal; but if this condition ceaſes, the conſequence varies. Greater heights give more than ſmaller ones, and the exceſs of the expence is in the ſubduplicate ratio, or as the ſquare roots, of the heights.

The following is another table of M. Mariotte, which ſhews the expence of water for different heights, and the ſame ajutage.

	Feet		Pints
Height	6	— — — — — — —	10
———	8	— — — — — — —	11 $\frac{1}{2}$
———	9	— — — — — — —	12 $\frac{1}{8}$
———	10	— — — — — — —	12 $\frac{5}{6}$
———	12	— — — — — — —	14
———	15	— — — — — — —	15 $\frac{2}{3}$
———	18	— — — — — — —	17
———	20	— — — — — — —	18 $\frac{1}{2}$
———	25	— — — — — — —	20 $\frac{1}{12}$
———	30	— — — — — — —	22 $\frac{1}{18}$
———	35	— — — — — — —	24
———	40	— — — — — — —	34 $\frac{1}{6}$
———	45	— — — — — — —	27 $\frac{1}{8}$
———	48	— — — — — — —	28

Obſerve, that in both tables the fractions of fractions are neglected, as inſenſible quantities; and the expences of water are calculated for one minute of time. Moreover, if the expence of two reſervoirs, of unequal heights, and different ajutages, be required, proceed by the following

lowing rule. The expence of water of two reſervoirs; whoſe heights are different and alſo their ajutages, are in the compound ratio of the ſquares of the diameters of the ajutages, and of the ſubduplicate ratio of the heights.

Water ſpouting upwards, through an ajutage, would aſcend to the ſame height as that of its upper ſurface in the reſervoir, were it not for the reſiſtance of the air, the friction at the ſides of the ajutage, and ſome little impediments of the motion of the water in itſelf; on account of all which, this height of the riſe is always defective.

It is found, by experience, that if the direction of the ajutage be a ſmall matter inclined, the water will riſe higher than if it be truly upright; and that a poliſhed round hole, in a thin plate of metal, at the top of the pipe, by way of ajutage, will ſuffer the water to ſpout higher than when it is cylindrical or conical.

Experience alſo ſhews, that the bigneſs of the pipe of the ajutage ſhould be enlarged at and near the ſurface of the water in the reſervoir, and that ſuch pipe ſhould be much larger than the ajutage; alſo, that there is a certain length among the ſeveral diameters of the ajutages, which will give the ſpout the greateſt height poſſible, and which muſt not exceed an inch and a quarter. Likewiſe the height of the ſpout muſt have its limits, an hundred feet being almoſt as much as it will bear.

Let A B (plate VII. *fig.* 3.) be the height of a ciſtern filled with water, which biſect in C; about the center C with the radius C B, deſcribe the ſemicircle A D B: now, if E be an ajutage in the ſide of the ciſtern, and E D be drawn perpendicular to A B, alſo B G, upon the horizontal plane, and taken equal to 2 E D, the water will run out from E to G, which may be thus proved. It is well known that E H F, the curve which the water iſſuing from the aperture at E deſcribes in its fall, is the common parabola; alſo that the velocity of the effluent water at E muſt, in order that it may deſcribe the ſaid parabola, be equal to that which a heavy body would acquire by falling through a height equal to ¼ of its parameter. See PROJECTILE.

But ſince this velocity is acquired by the deſcent through A E, it follows that A E muſt be ¼ of the parameter, or, which is the ſame thing, $AE=\frac{BG^2}{4BE}$. By the foregoing conſtruction we have $CB^2-CE^2=ED^2$, $CB-CE=AE$, and $BG=2\,ED$; conſequently $BG^2=4\,ED^2$; therefore $AE=\frac{ED^2}{BE}$; that is, $CB-CE=\frac{ED^2}{BE}$; for ED^2 put its equal CB^2-CE^2, we have $CB-CE=\frac{CB^2-CE^2}{BE}$: divide each ſide by $CB-CE$, there will ariſe $1=\frac{CB+CE}{BE}$, or $BE=CB+CE$, which being manifeſt, by the figure, proves the above conſtruction to be juſt.

Hence it follows, that a liquid ſpouting from a hole in the center C, will go to the greateſt diſtance poſſible; and that all apertures equally above and below the center C, have exactly the ſame amplitudes upon the horizontal plane. Let the areas of the baſes of two unequal cylindrical veſſels of water, be called B and *b*, their heights H and *b*, D and *d* the areas of the holes or ajutages through which they are evacuated, T and *t* the times of running reſpectively; then the quantities run out from thoſe cylinders (conſtantly kept full), in the times T and *t*, will be in the proportion of $T\times\sqrt{H}\times D$ to $t\times\sqrt{b}\times d$. Wherefore, expounding thoſe quantities by Q and *q*, we ſhall have $T\times\sqrt{H}\times D : t\times\sqrt{b}\times d :: Q : q$. If $Q : q :: B+H : b\times b$; then $T\times\sqrt{H}\times D : t\times\sqrt{b}\times d :: B\times H : b\times b$, and by multiplying extremes and means, we get $T\times\sqrt{H}\times D\times b\times b=t\times\sqrt{b}\times d\times B\times H$, whence $T\times D\times b\times\sqrt{b}=t\times d\times B\times\sqrt{H}$. From theſe equations may be deduced the following corollaries.

1. The ſquares of the quantities flowing out from the ſame ajutage, in equal times, are in the ratio of the heights of the liquid above the aperture: for when $T=t$, and $D=d$, $Q^2 : q^2 :: H : b$.

2. The times in which cylindrical veſſels of the ſame diameter and height are emptied, the liquid flowing from unequal apertures, are in the inverſe ratio of the areas of thoſe apertures. For $T : t :: d : D$, when $H=b$ and $B=b$.

3. Cylindrical veſſels of unequal baſes, but of equal heights, are emptied through equal apertures in times that are in the ratio of their baſes. For $T : t :: B : b$, when $H=b$ and $D=d$.

4. The times in which any cylindrical veſſels are evacuated, are in a ratio compounded of the baſes, the inverſe ratio of the apertures, and direct ratio of the ſquare roots of the heights. For $T : t :: B\times d\times\sqrt{H} : b\times D\times\sqrt{b}$.

If the ſide of a cylindrical veſſel, beginning from the baſe, be divided into lengths, which are as 1, 4, 9, 16, &c. viz. the ſquares of the natural numbers 1, 2, 3, 4, &c. the ſurface of the water (running out through a hole or aperture at the bottom) will deſcend from each of thoſe diviſions to the next, in the ſame time.

In the above inveſtigations, we always ſuppoſe the velocity of the effluent water to remain conſtant during the evacuation; and therefore, when we ſpeak of the time of emptying a cylindrical veſſel, we only mean that time in which (the veſſel being kept conſtantly full) a quantity of the liquid, equal in magnitude to the capacity of the veſſel, will flow through the ajutage, or aperture, in the ſide of the perpendicular cylinder.

AJUTANT, in military affairs. See the article ADJUTANT.

ALA, in botany, is uſed in various ſenſes; ſometimes it denotes the hollow between the ſtalk of a plant and its leaves; and ſometimes it is applied to the two ſide petals of the papilionaceous flowers; the upper petal being called the *vexillum*, and the lower the *carina*: others uſe it for the ſlender membranaceous parts of ſome ſeeds; and others again for the membranaceous expanſions, found on the ſtems of plants, thence called alated ſtalks.

The word is Latin, and properly ſignifies a wing.

ALÆ, in anatomy, is ſometimes uſed for the lobes of the liver, the nymphæ of the female pudendum, the two cartilages which form the noſtril, the arm-pits, &c.

ALÆ, among the ancient Romans, ſignified the two wings, or extreme parts of the army, drawn up in order of battle.

ALABASTER, *Alabaſtrites*, in natural hiſtory, the name of a genus of foſſils, nearly allied to that of marble. It is an elegant ſtone of great brightneſs, and will receive a fine poliſh, but is brittle.

Naturaliſts enumerate ſeveral ſpecies of alabaſter; as, the ſnow-white ſhining alabaſter, or that called the lygdine by the ancients. Boet informs us, that this ſtone is extremely white, and found in Taurus in pieces only large enough to make diſhes and the like; but it was formerly brought from Arabia. It is not very compact, but heavy, and conſiſts of a multitude of broad flat large particles, which are very bright and perfectly white. It cuts very freely, and is capable of a fine poliſh. There are very large ſtrata of it in Arabia, Egypt, and many parts of Italy; but it is ſeldom brought over to England.

Whitiſh yellow alabaſter is of a ſoft conſiſtence, and called, by Boet, the phengites of Pliny, who affirms it was found in Cappadocia, and that Nero built the temple of Fortune with whitiſh yellow alabaſter. This temple ſhone on the inſide, like paper ſmeared with oil, and not tranſparent. He farther adds, that this ſpecies of alabaſter differs in nothing from common marble but in hardneſs, and in its ſhining when poliſhed. It is of a looſe open texture, conſiderably heavy, and nearly of the colour of honey; but the colour is more deep in ſome places than others. It conſiſts of irregular pieces lying in tables one over another, though with regularity, and altogether compoſe a remarkable bright and very brittle maſs. Beſides the places above-mentioned, it has been found in Germany, France, and Derbyſhire.

Yellow and reddiſh variegated alabaſter is the common alabaſter of the ancients. It is ſo ſoft that it may be cut with a knife; and has the ſame name in all languages. It is remarkably bright, glittering, and almoſt tranſparent;

and its texture very looſe and open, though it is moderately heavy. The ground is of a clear pale yellow, between that of honey and amber, and has the ſame texture as the phengites: but it is beautifully variegated with crooked undulated veins, ſome of which are broad, and others narrow; ſome of a pale red, others whitiſh, and others again of a very agreeable pale brown. It will bear a very fine poliſh, and conſiſts of large angular ſparry concretions. It was formerly found only in Egypt, but is now met with in many parts of England. *Brookes's Natural Hiſtory.*

ALABASTRÆ, in botany, was a name given by the ancients to the cup of flowers, particularly to the roſe before it is expanded.

A-LA-MI-RE, among muſicians, is the name of a note in the modern ſcale. See GAMUT.

ALAMODE, in commerce, the name of a very thin, gloſſy, black, ſilk, chiefly uſed for women's hoods and men's mourning ſcarfs.

ALARES *Muſculi*, in anatomy, the Latin name of the muſcles generally called pterygoidei. See the article PTERYGOIDEUS.

ALARM, in military affairs, implies either the apprehenſion of being ſuddenly attacked, or the notice of ſuch an attack, ſignified by the firing of a cannon, muſket, or the like.

Falſe alarms are frequently made uſe of to harraſs the enemy, by keeping them continually under arms.

ALARM-BELL, the bell rung upon any ſudden emergency, as a fire, mutiny, approach of an enemy, or the like.

ALARM-POST, the place appointed for drawing up a regiment in caſe of an alarm.

ALARM, the name of a kind of clock, contrived for waking people at a certain hour, by making an uncommon noiſe, &c.

ALATED *Leaves*, in botany, are thoſe compoſed of ſeveral pinnated ones. See PINNATED.

ALATERNUS, in botany, the name of a diſtinct genus of plants, according to Tournefort's ſyſtem; but comprehended by Linnæus among the rhamnuſes. Its flower conſiſts of one funnel-ſhaped leaf, divided into four deep ſegments; and the fruit is a berry, containing, for the moſt part, three ſeeds, globoſe on one ſide, and angular on the other.

ALAUDA, the lark. See the article LARK.

ALB, or ALBE, in the Roman church, a veſtment of white linen, hanging down to the feet, and anſwering to the ſurplice of our clergy. It was cuſtomary in the ancient church for thoſe newly baptized to wear the alb, or white veſtment; and hence the Sunday after Eaſter was called *Dominica in Albis*, on account of the albs worn by thoſe who had been baptized on Eaſter day.

ALB is alſo the name of a Turkiſh coin, otherwiſe called aſper. See the article ASPER.

ALBANENSES, Chriſtian heretics in the reign of the emperor Conſtantine VI. and the pontificate of Leo III. about the year 796. Their principal errors were as follow: they held, with the Gnoſtics and Manichæans, two principles, the one of good, the other of evil; and they aſcribed the Old Teſtament to the evil god, and the New Teſtament to the good god. They held, with Pythagoras, a tranſmigration of ſouls. They denied the divinity, and even humanity, of Jeſus Chriſt, aſſerting that he was not truly man, that he did not really eat, nor ſuffer on the croſs, nor die, nor riſe again, nor aſcend into heaven. They denied a reſurrection of the body, and affirmed, that the general judgment was paſt. They held, that there had never been a good man in the world before Jeſus Chriſt, and therefore that neither Adam nor Moſes were from God. They denied that there was any virtue or efficacy in baptiſm. They ſaid likewiſe, that the bad life of prelates hurt the ſacraments; that no bad man could be a biſhop; that the church ought to have every thing in common, and could not excommunicate any perſon, or make any conſtitutions. They believed, that hell-torments were no other than the evils we feel and ſuffer in this life. They rejected the ſacrament of the altar, and extreme unction; they did not admit original ſin; for which reaſon they never adminiſtered baptiſm to infants. They denied free-will. They held the eternity of the world. They diſallowed of marriage. They ſaid, that uſury was not prohibited, and that no one was obliged to reſtitution. They held, that a man gives the holy ſpirit of himſelf, and that it is unlawful for a Chriſtian to take an oath.

ALBANI, in antiquity, a college of the Salii, or the prieſts of Mars, ſo called from Mount Albanus, the place of their reſidence.

ALBATI, a ſort of Chriſtian hermits, in the year 1399, in the time of pope Boniface IX. They were ſo called from the white linen which they wore. They came down from the Alps into ſeveral provinces of Italy, under the conduct of a prieſt cloathed in white, and holding a crucifix in his hand. The followers of this prieſt, whoſe great zeal made him looked upon as a ſaint, multiplied ſo faſt, that it alarmed the pope, who, ſending ſoldiers, apprehended and put him to death; upon which his followers immediately diſperſed. Theſe monks profeſſed ſorrow and weeping for the ſins and calamities of the times: they eat together in the highways, and ſlept promiſcuouſly.

ALBE, a ſmall piece of money, current in Germany, worth about three halfpence.

ALBERTUS, a gold coin, worth about fourteen ſhillings; it was coined during the adminiſtration of Albertus, archduke of Auſtria.

ALBIGENSES, a ſect or party of reformers, about Toulouſe and Albigeois, in Languedoc, who ſprung up in the 12th century, and diſtinguiſhed themſelves by their oppoſition to the diſcipline and ceremonies of the church of Rome. They were likewiſe called Waldenſes.

Their riſe was occaſioned by an accident. It happened, at Lyons, in a great concourſe of people, that one of them fell down on a ſudden dead, at which all that were preſent were extremely terrified; in particular one Peter Waldius, who immediately ſold his goods, and divided them amongſt the poor. Great multitudes preſently flocked about him, and he, being ſomething of a ſcholar, read and explained to them the New Teſtament in their own tongue, and inſtructed them in the true principles of the Chriſtian religion. The number of his diſciples increaſing greatly, this ſect ſpread, and prevailed every where.

At length the Albigenſes grew ſo formidable, that the Catholics agreed upon a holy league or cruſade againſt them. They were at firſt ſupported by Raimond, count of Toulouſe. Pope Innocent III. deſirous to put a ſtop to their progreſs, ſent a legate into their country; but this failing, he ſtirred up Philip Auguſtus, king of France, and the other princes and great men of the kingdom, to make war upon them; upon which the count of Toulouſe, who had ſided with them, made his ſubmiſſion to the pope, and went over to the Catholics: but ſoon after, finding himſelf plundered by the cruſaders, he declared war againſt them, and was joined by the king of Arragon. His army was defeated at the ſiege of Muret, where he himſelf was killed, and the defeat followed by the ſurrender of the city of Toulouſe, and the conqueſt of the greateſt part of Languedoc and Provence. His ſon Raimond ſucceeded him, who agreed with the king and the pope to ſet up the inquiſition in his eſtates, and to extirpate the Albigenſes. In an aſſembly held at Milan, the archbiſhop of Toulouſe drew up articles, agreeable to which the count made a moſt ample declaration againſt them, which he publiſhed at Toulouſe, in 1253. This laſt blow completed the ruin of the Albigenſes.

The errors with which they were charged are theſe: 1. That they acknowledged two principles, the one good, the other evil; the firſt, creator of things inviſible and ſpiritual, the ſecond, creator of bodies, and guardian of the Old Teſtament. 2. That they admitted likewiſe two Chriſts; the one wicked, who was he that had appeared on earth; the other good, who was not yet come. 3. That they denied the reſurrection of the body, and believed that the ſouls of men are demons ſent into their bodies for the puniſhment of their ſins. 4. That they condemned all the ſacraments of the church, and believed marriage to be unlawful.—As to their manner of life, there were ſaid to be two ſorts of people among them, the Perfect, and the Believers. The Perfect boaſted of their living in continence, of eating neither fleſh, eggs, nor cheeſe. The Believers lived like other men, and were even looſe in their morals; but they were perſuaded they ſhould be ſaved by the faith of the Perfect, and that none were damned who received impoſition of hands from them.

But, perhaps, this charge againſt them was only calumny: for Æneas Sylvius, giving an account of them, ſays, that this ſect had a great appearance of piety; that they lived juſtly before men, and believed all the articles of the creed; and that they only blaſphemed the church of Rome and the clergy. *Hinc illæ lacrymæ:* it was their oppoſing the received doctrines of that church, and the corrupt manners of the eccleſiaſtics, that drew upon them the ſtorm which ended in their deſtruction.

ALBION, the ancient name of Britain. See the article BRITAIN.

ALBITROSSE, the name of a bird, very common in ſeveral parts of the Weſt-Indies; but not reduced to any certain genus.

ALBORAK, among Mahometan writers, the beaſt on which Mahomet rode in his journey to heaven.

ALBUGINEA *Tunica*, in anatomy, the third or innermoſt coat of the teſticles, ſo called from its white colour.

ALBUGINEA is alſo a name given by ſome anatomiſts to one of the coats of the eye, called alſo adnata. See the article EYE.

ALBUGINEUS, an appellation given by ſome to the aqueous humour of the eye. See EYE.

ALBUGO, among phyſicians, denotes a diſtemper of the eye, cauſed by a white, denſe, and opaque ſpot, growing on the tunica cornea.

The word is formed from the Latin *albus*, white.

This is a troubleſome diſeaſe, which is more or leſs offenſive to the ſight, according to the greater or leſs portion of the tranſparent part of the cornea affected by it: for ſometimes it fixes on the exterior ſurface only of this membrane, ſometimes on the interior, and ſometimes it runs more or leſs deep into it.

It is moſt commonly the conſequence of inflammations, by the extravaſation of humours between the membranes of this tunicle, and particularly in the ſmall-pox, by the ſuppuration of puſtules upon this part.

I have, ſays the learned Dr. Mead, made uſe of two methods of cure for this diſorder of the ſight; the one in the outward ſort, the other in the inward. In the former caſe I ordered the following powder.

Take of common glaſs any quantity; pound it in a mortar, into a very fine powder; then add an equal quantity of white ſugar-candy, and levigate the mixture on a marble with great labour, till it becomes quite impalpable.

A little of this powder, put into the eye with a quill every day, gradually abſterges and wears off the ſpot by its inciding quality. The other method above-mentioned of removing this ſpeck is, to order a dexterous ſurgeon to pare it cautiouſly every day with a knife; for this tunicle is compoſed of ſeveral lamellæ one over another, and has thickneſs enough to bear paring off ſome of its parts. I have ſeen ſeveral inſtances of cures by the eye-powder, but the paring of the coat has not ſucceeded with me above once or twice. However, it is better to try a doubtful remedy than none. *Mead's Monita & Præcepta.*

The French ſurgeons ſcarify the eye for this diſeaſe with the briſtles or beards of rye-graſs; that is, about twenty or twenty-five of them tied together, like a little bruſh or pencil; and with this they bruſh the eyes ſometimes till a little blood comes, repeating the ſame every other or third day, four or five times, or more. After the operation, they waſh the eye very often with warm water, and at night apply the pulp of a roaſted apple.

ALBUM, in antiquity, a kind of table or regiſter, wherein the names of certain magiſtrates, public tranſactions, &c. were entered.

ALBUM *Græcum*, in the old materia medica, the white dung of dogs, ſaid to be good for inflammations of the throat; but little regarded at preſent.

ALBUMEN, a term uſed by medical writers for the white of an egg.

It is uſed in collyriums, on account of its cooling and agglutinating quality: it is alſo often an ingredient in ointments for burns.

ALBURN, the Engliſh name for a ſort of compound colour, formed by mixing red and white.

ALCAICS, in ancient poetry, a denomination given to ſeveral kinds of verſe, from Alcæus their inventor.

The firſt kind conſiſts of five feet, viz. a ſpondee, or iambic; an iambic; a long ſyllable; a dactyle; another dactyle: ſuch is the following verſe of Horace,

Omnes | eo | dem cogimur, | omnium
Verſa | tur ur | nâ | ſerius | ocyus |
Sors exitura.

The ſecond kind conſiſts of two dactyles and two trochees: as

Exili | um impoſi | tura | cymbæ.

Beſides theſe two, which are called dactylic Alcaïcs, there is another ſtiled ſimply Alcaïc; conſiſting of an epitrite; a coriambus; another coriambus; and a bacchius; the following is of this ſpecies,

Cur timet fla | vum Tiberim tangere, cur | olivum?

ALCAIC *Ode*, a kind of manly ode, compoſed of ſeveral ſtrophes, each conſiſting of four verſes; the two firſt of which are always Alcaïcs of the firſt kind; the third verſe is a diameter hypercatalectic, or conſiſting of four feet and a long ſyllable; and the fourth verſe is an Alcaïc of the ſecond kind. The following ſtrophe s of this ſpecies, which Horace calls *minaces Alcæi camenæ.*

Non poſſidentem multa vocaveris
Recte beatum: rectius occupat
Nomen beati, qui deorum
Muneribus ſapienter uti, &c. Hor.

ALCAID, ALCAYDE, or ALCALDE, among the Spaniards and Portugueſe, is a magiſtrate, or officer of juſtice, anſwering nearly to our juſtice of peace. The alcaid is properly a Mooriſh officer, where he is inveſted with ſupreme juriſdiction, both in civil and criminal caſes.

ALCALI, or ALKALI, a general appellation given by phyſicians and chemiſts to all ſubſtances, which, on being mixed with acids, excite an effervеſcence.

The word originally ſignified the ſalt extracted from the aſhes of *kali*, or glaſs wort: but was afterwards applied to all ſalts that efferveſced with acids.

Alcalies are generally divided into two kinds, and diſtinguiſhed by the epithets of *fixed* and *volatile*.

Fixed ALKALIES are diſtinguiſhed from ſaline ſubſtances not alkaline, by their efferveſcing with all acids, forming with them neutral ſalts, precipitating ſolutions made in acids, and changing ſyrup of violets green.

They are diſtinguiſhed from volatile alcalies by their fixity and fuſibility in the fire, by their deliquiating in the air, and never aſſuming a cryſtalline form, changing ſolution of mercury ſublimate not white, but of an orange yellow, producing no blue colour with copper or its ſolutions, raiſing no viſible cloud when placed near an unſtopt bottle of ſpirit of nitre, occaſioning no coldneſs but rather heat on being diſſolved in water. Pure fixed alcalies, diſſolved in water, mingle with a ſolution of any other pure alcali, without the leaſt precipitation, turbidneſs, or ſenſible change.

Fixed alcalies diſſolve ſulphur, oils, fats, and reſinous bodies. By quick-lime their activity is increaſed, and in this ſtate they diſſolve ſome metallic ſubſtances, as calces or filings of lead, fine filings of copper, copper precipitated from vitriol, the copper in verdigris, tin, and regulus of antimony: this laſt they corrode into a calx, which, by force of fire, may be melted into an amber-coloured glaſs. There are two ways of obtaining ſolutions of iron in theſe ſalts: one, by dropping a ſolution of the metal made in aqua-fortis into a ſtrong alcaline ley, the acid will be abſorbed and neutralized by a part of the alcali, and the iron remains diſſolved by the reſt: the other is, by deflagrating iron-filings with nitre, the acid of the nitre will be diſſipated in the deflagration, and great part of the iron will diſſolve in water along with the remaining alcali. Theſe ſalts, combined with ſulphur, diſſolve almoſt all the metals and ſemi-metals, gold itſelf not excepted. When made fluid by a ſtrong fire, they diſſolve flint, ſand, and other earthy bodies, and on cooling concrete with them into a maſs, which proves diſſoluble in water, or an indiſſoluble glaſs, according as the proportion of the earth is large or ſmall. Added to phlegmatic ſpirits, either of the inflammable or volatile urinous kind, they imbibe the redundant phlegm, and thus render the ſpirit more concentrated. In pure vinous ſpirits they do not diſſolve, or only in very ſmall quantity, ſufficient however to give a ſenſible acrimony or alkaline impregnation to the ſpirit. If both the ſpirit and the ſalt are pure, the liquor receives no colour; but if any oily or reſinous matter be previouſly diſſolved in the ſpirit, or if the ſalt be impregnated, though ſlightly, with inflammable matter of any kind, a conſiderably deep tincture will be produced. Fixed alkalies, in general, heighten the colour of vegetable and animal tinctures, whether drawn with water or with ſpirit; but they commonly vary the taſte, and often debaſe the ſmell of the preparation.

They form, with acids, different neutral ſalts, according to the nature of the acid employed; with the vitriolic, a bitteriſh ſalt, very difficult of ſolution in water, and not fuſible in the fire, commonly called vitriolated tartar, the alkaline ſalt made from tartar being that which has chiefly been employed for theſe purpoſes; with the nitrous acid, they form a perfect nitre; with the marine, a ſalt greatly reſembling ſea-ſalt, being in ſome reſpects different from the common vegetable alkalies. They readily cryſtallize with any of the mineral acids, and with tartar; with which laſt they compoſe a neutral ſalt, much eaſier of ſolution than the tartar itſelf, and hence called ſoluble tartar. They do not eaſily cryſtallize with the acid of vinegar or lemon juice; theſe mixtures, if by careful management reduced to a cryſtalline form, ſoon deliquiate again in the air.

There are different ways, beſides immediate mixture, of obtaining combinations of fixed alkalies with acids, depending upon their great affinities with one another. Thus, when any metallic body is diſſolved in an acid, the addition of an alkaline ſalt precipitates the metal: if the remaining liquor be filtered and evaporated, it leaves a neutral ſalt, compoſed ſolely of the acid and the alkali. Some of the metals ſuffer a notable alteration in this proceſs: thus the calx of iron, precipitated from the vitriolic acid in making vitriolated tartar, is ſcarce at all revivable into malleable iron again. When acids are combined with volatile alkalies into ammoniacal ſalts, and this compound mixed with a fixed alkali; on expoſing the mixture to the action of a moderate fire, in a retort or other convenient veſſel, the volatile alkali ariſes, and the acid remains combined with the fixed: if it was not for the intervention of the fixed alkali, it would ſublime in conjunction with the volatile. In like manner, when ſulphur, or oils, or reſins, are diſſolved by a fixed alkali, the addition of any acid will ſeparate the ſubſtance before diſſolved, the acid and the alkali uniting together; and even when both of them are previouſly ſaturated, the alkali, for inſtance, with ſulphur, and the acid with metal, on mixing the two ſolutions together, both the ſulphur and the metal fall, leaving only the alkali and the acid combined in the liquor. When the alkali is previouſly combined with one acid, the addition of a more powerful acid will break the union, and diſengage the alkali from the firſt acid. On the neutral ſalt, compoſed of fixed alkali and vinegar, pour ſome ſpirit of common ſalt; the acetous acid will inſtantly begin to exhale, and, on applying a moderate heat, will be totally diſſipated, leaving the alkali combined with the marine acid. Add to this combination a due proportion of the nitrous acid, and the marine will be expelled, and a perfect nitre remain. The vitriolic, in like manner, expels the nitrous, and takes poſſeſſion of the alkali in its place: this being the moſt powerful acid, is not to be diſlodged by any other.

When this acid is combined with inflammable matter into ſulphur, it loſes its great affinity to alkalies. If the neutral ſalt, compoſed of the vitriolic acid and fixed alkali, be melted with powdered charcoal, the reſult is a mixture of alkali and ſulphur. On diſſolving this compound in water, the ſlighteſt even of the vegetable acids precipitates the ſulphur, and unites the alkali. *Neumann's Chemiſtry.*

Preparation of fixed ALCALIES.—The moſt commodious method of preparing fixed alkaline ſalts in the large way, ſeems to be that directed by Kunckel in his Art of Glaſs. The aſhes of wood, or the woody parts of vegetables, either burnt on purpoſe or as common fuel, are to be put into a large tub or vat, whoſe bottom is covered with pieces of ſplit wood and ſtraw, to prevent the aſhes from ſtopping up the cock. So much water is to be poured on the aſhes as may totally cover them: after ſtanding for a night, the liquor, impregnated with their ſaline part, is to be let off by the cock at the bottom into another veſſel; and the elixation repeated with freſh water ſo long as the ley has any ſaline taſte. The elixated aſhes may be uſed, like common wood-aſhes, for manure; and the weak leys may be rendered ſtronger, by pouring them, inſtead of plain water, upon a freſh quantity of aſhes. Thus from every parcel of aſhes we obtain a ſtrong ley, with a weaker one to be returned on the next. Where the ley is to be kept in its liquid ſtate, wooden veſſels (according to him) are more commodious than earthen ones, however glazed; theſe laſt being ſooner corroded and penetrated by the acrid liquor.

In procuring a ſolid ſalt, the ley is to be evaporated in an iron pan, fixed in brick-work; freſh ley being continually ſupplied during the evaporation, in a very ſlender ſtream, from a caſk placed on the brick-work, till the quantity of ſalt is as large as can be conveniently dried in the veſſel. This impure brown or blackiſh ſalt is to be calcined, in a furnace built for that uſe, with a red heat juſt not ſtrong enough to melt it, and every now and then turned up and ſtirred for ſix or ſeven hours, or till ſome of the larger pieces, taken out and broke, appear internally white. Thus we obtain an alkali ſufficiently pure for all the buſineſſes in which theſe kinds of ſalts are employed: if, for particular purpoſes, a further purification ſhould be required, it may be diſſolved, inſpiſſated, and calcined afreſh. The rough ſalt loſes, in the firſt calcination, commonly about one tenth of its weight.

Some ſoak in the ley a quantity of ſtraw, bean-ſtalks, or other like ſubſtances, ſufficient to imbibe it; and, by drying and burning theſe, obtain the ſalt of the ley, without the trouble of boiling it down. The earthy matter left by the ſtraw is, in quantity, inconſiderable, and, for many purpoſes, of no injury to the ſalt, particularly for ſoap-boiling, bleaching, &c. where the ſalt is diſſolved, and conſequently purified from indiſſoluble earthy admixtures before it is uſed. There is nevertheleſs one great inconvenience in the proceſs; the ſtraw, when loaded with the alkali, being very difficultly made to burn. Vegetable ſubſtances in general, when fully impregnated with fixed alkaline ſalts, never flame; and do not burn at all without a continuance of external heat, inſomuch that ſome have propoſed the impregnating of wood for buildings with ſalts, as an effectual means for preventing its receiving or communicating fire.

The ſtrength of leys, or the quantity of ſalt diſſolved in them, may be eſtimated by the weight of a certain meaſure of them, compared to the weight of an equal meaſure of water; or more commodiouſly, and perhaps as accurately, by means of an hydrometer graduated from actual trials with leys of known ſtrength. *Neumann's Chemiſtry.*

Volatile ALCALIES are ſalts formed by a new combination of the conſtituting particles of a natural body, by the operation of putrefaction.

Volatile alkalies, from whatever ſubſtance obtained, are all alike, and have the ſame properties; differing only according to their degrees of purity. The volatile alkali, as well as the fixed, conſiſts of a certain quantity of acid, combined with and entangled by a portion of the earth of the mixed body from which it was obtained; and on that account it has many properties like thoſe of a fixed alkali. But there is, moreover, in its compoſition, a conſiderable quantity of a fat or oily matter, of which there is none in a fixed alkali; and, by this means, there is a great difference between them. Thus the volatility of the alkali produced by putrefaction, which is the principal difference between it and the other kind of alkali, whoſe nature it is to be fixed, muſt be attributed to the portion of oil which it contains: for there is a certain method of volatilizing fixed alkalies, by means of a fatty ſubſtance.

Volatile alkalies have a great affinity with acids, unite therewith rapidly and with ebullition, and form with them neutral ſalts, which ſhoot into cryſtals, but differ from one another according to the kind of acid employed in the combination.

The neutral ſalts which have a volatile alkali for their baſis, are in general called ammoniacal ſalts. That whoſe acid is the acid of ſea-ſalt, is called ſal ammoniac. As this was the firſt known, it gave name to all the reſt. Great quantities of this ſalt are made in Egypt, and thence brought to us. They ſublime it from the ſoot of cows-dung, which is the fewel of that country, and contains ſea-ſalt, together with a volatile alkali, or at leaſt the materials proper for forming it; and conſequently all the ingredients that enter into the compoſition of ſal ammoniac. See the Memoirs of the Academy of Sciences.

The neutral ſalts formed by combining the acids of nitre and of vitriol with a volatile alkali are called, after their acids, nitrous ſal ammoniac and vitriolic ſal ammoniac: the latter, from the name of its inventor, is called Glauber's ſecret ſal ammoniac.

A volatile alkali, then, has the ſame property as a fixed alkali, with regard to acids; yet they differ in this, that the affinity of the former, with acids, is weaker than that of the latter: and hence it follows, that any ſal ammoniac may be decompounded by a fixed alkali, which will lay hold of the acid, and diſcharge the volatile alkali.

A volatile alkali will decompound any neutral ſalt which has not a fixed alkali for its baſis; that is, all ſuch as conſiſt of an acid, combined with an abſorbent earth or a metallic ſubſtance. By joining with the acids, in which they are diſſolved, it diſengages the earths or metallic ſubſtances, takes their place, and in conjunction with their acids forms ammoniac ſalts.

Hence it might be concluded that, of all ſubſtances, next to the phlogiſton and the fixed alkalies, volatile alkalies have the greateſt affinity with acids in general: yet there is ſome difficulty in this matter; for abſorbent earths and ſeveral metallic ſubſtances are alſo capable of decompounding ammoniacal ſalts, diſcharging their volatile alkali, and forming new compounds by uniting with their acids. This might induce us to think that theſe ſubſtances have nearly the ſame affinity with acids.

But it is proper to obſerve, that a volatile alkali decompounds ſuch neutral ſalts as have for their baſis either an abſorbent earth or a metallic ſubſtance, without the acid of fire; whereas abſorbent earths or metallic ſubſtances will not decompound an ammoniacal ſalt, unleſs they be aſſiſted by a certain degree of heat.

Now, as all theſe matters are extremely fixed, at leaſt in compariſon with a volatile alkali, they have the advantage of being able to reſiſt the force of fire, and ſo of acting in conjunction therewith; and fire greatly promotes the natural action of ſubſtances upon one another: whereas the volatile alkali in the ammoniacal ſalt, being unable to abide the force of fire, is compelled to deſert its acid; and that ſo much the more quickly, as its affinity therewith is conſiderably weakened by the preſence of an earthy or metallic ſubſtance, both of which have a great affinity with acids.

Theſe conſiderations oblige us to conclude, that volatile alkalies have a ſomewhat greater affinity than abſorbent earths and metallic ſubſtances with acids.

Ammoniacal ſalts, projected upon nitre in fuſion, make it detonate; and the nitrous ſal ammoniac detonates by itſelf, without the addition of any inflammable matter. This ſingular effect evidently demonſtrates the exiſtence of any oily matter in volatile alkalies; for it is certain that nitre will never deflagrate without the concurrence, and even the immediate contact, of ſome combuſtible matter.

This oily ſubſtance is often found combined with volatile alkalies in ſuch a large proportion as to diſguiſe it in ſome meaſure, and render it exceeding foul. The ſalt may be freed from its ſuperfluous oil by repeated ſublimations; and particularly by ſubliming it from abſorbent earths, which readily drink up oils. This is called the rectification of a volatile alkali. The ſalt, which before was of a yellowiſh or dirty colour, by being thus rectified, becomes very white, and acquires an odour more pungent and leſs fetid than it had at firſt; that is, when obtained by one ſingle diſtillation from a putrid ſubſtance.

It is proper to obſerve, that the rectification of a volatile alkali muſt not be carried too far, or repeated too often; for by that means it may be entirely decompoſed at length; and particularly if an abſorbent earth, and eſpecially chalk, be employed for that purpoſe, the ſalt may be converted into an oil, an earth, and water.

Volatile alkalies act upon ſeveral metallic ſubſtances, and particularly on copper; of which they make a moſt beautiful blue ſolution. On this property depends a pretty ſingular effect, which happens ſometimes when we attempt, by means of a volatile alkali, to ſeparate copper from any acid with which it is combined. Inſtead of ſeeing the liquor grow turbid, and the metal fall, both which generally happen when any alkali whatever is mixed with a metallic ſolution, we are ſurpriſed to obſerve the ſolution of copper, upon adding a volatile alkali, retain its limpidity, and let fall no precipitate; or at leaſt, if the liquor does grow turbid, it remains ſo but for a moment, and inſtantly recovers its tranſparency.

This is occaſioned by adding ſuch a quantity of volatile alkali, as is more than ſufficient fully to ſaturate the acid of the ſolution, and conſiderable enough to diſſolve all the copper as faſt as it is ſeparated from the acid. On this account the liquor acquires a deeper blue than it had before; which ariſes from the property which volatile alkalies have of giving this metal, when combined with them, a fuller blue than any other ſolvent can: hence we have a touch-ſtone to diſcover copper whereever it is; for let the quantity of this metal, combined with other metals, be ever ſo ſmall, a volatile alkali never fails to diſcover it, by making it appear of a blue colour.

Though a volatile alkali be conſtantly the reſult of putrefaction, yet it muſt not therefore be imagined that none can be produced by any other means; on the contrary, moſt of thoſe ſubſtances which contain the ingredients neceſſary to form it, yield no inconſiderable quantity thereof in diſtillation. Tartar, for example, which by being burnt in an open fire, is converted into a fixed alkali, yields a volatile alkali when it is decompoſed in cloſe veſſels; that is, when it is diſtilled: becauſe, in this latter caſe, the oily part is not diſſipated or burnt, as it is by calcination in a naked fire, but has time to unite with ſome of the earth and acid of the mixed in ſuch a manner, as to form a true volatile alkali.

To prove that on this occaſion, as well as on all others, where unputrified bodies yield a volatile alkali, this ſalt is the product of the fire, we need only obſerve, that, in theſe diſtillations, it never riſes till after ſome part of the phlegm of the acid, and even of the thick oil, is come over; which never is the caſe when it is formed beforehand in the body which is the ſubject of the operation, as it is in thoſe which have undergone putrefaction; for this ſalt, being much lighter and more volatile than thoſe other ſubſtances, riſes of courſe before them in diſtillation.

ALCANNA, in commerce, a powder prepared from the leaves of the Egyptian privet, in which the people of Cairo drive a conſiderable trade. It gives a yellow colour, when ſteeped in common water; and a red one when infuſed in vinegar or alum water. They alſo extract an oil of a very agreeable odour from the berries of the alcanna, and uſe it in medicine.

Knights of ALCANTARA, a military order in Spain. The knights of this order make a very conſiderable figure in the hiſtory of the Spaniſh expeditions againſt the Moors.

ALCE, in natural hiſtory, the name of an animal, generally called the elk. See the article ELK.

ALCEA, *Vervain Mallow*, in botany, a plant with a woody whitiſh root, from whence proceed ſeveral ſtalks to the height of about three feet round, full of pitch, and thinly beſet with longiſh hair. The leaves that proceed from the root and lower part of the ſtalks are roundiſh, with inciſſures on the edges; but thoſe that grow near the top, and placed alternately, are remarkably jagged, of a blackiſh green colour, and hairy, particularly on the lower part. The flowers are like thoſe of mallows, and of a purpliſh fleſh colour, though they are ſometimes white: they are ſucceeded by ſeeds, which are black when ripe, and ſhaped like thoſe of mallows. The medicinal virtues of this plant are the ſame with thoſe of mallow. *Brookes's Natural Hiſtory.*

ALCHEMIST, a perſon who profeſſes, or practiſes, the art of alchemy.

ALCHEMY, the ſublimer, or more abſtruſe, parts of chemiſtry. See the article CHEMISTRY.

The word is formed from the Arabic particle *al*, which ſignifies ſublime, or excellent, and *chemy*, chemiſtry. The term therefore properly ſignifies *the ſublime chemiſtry*, or *the chemiſtry*, by way of excellence.

ALCIS, in mythology, the name under which Minerva was worſhipped by the Macedonians.

ALCMANIAN, in ancient lyric poetry, a ſpecies of verſe conſiſting of two dactyls and two trochees. The following is of this kind.

Virgini | bus pue | riſque | canto.

ALCOA *Arbor*, the name of a tree found in St. Helena, the wood of which reſembles ebony; but it is not known to what genus it belongs.

ALCOHOL, in chemiſtry, ſignifies ſpirit of wine rectified by repeated diſtillations, till it has acquired the utmoſt ſubtilty and perfection poſſible.

By theſe repeated rectifications, it is not only freed from its redundant phlegm, but alſo from ſome particles of acid and oil, which, though much leſs volatile than itſelf, aſcends with it in the firſt diſtillation; nor is it poſſible wholly to avoid this inconvenience. See SPIRIT.

ALCOHOL alſo ſignifies a very fine impalpable powder. The oriental ladies uſe antimony, reduced to an impalpable powder, for blacking their eye-lids, and call this powder alcohol.

ALCOLA, a term uſed by ſome alchemiſts for the tartar of urine, found in ſmall grains of a reddiſh colour.

ALCORAN, AL-CORAN, or AL-KORAN, the Scripture, or bible, of the Mahometans.

The word is compounded of the Arabic particle *al*, and *coran*, or *koran*, derived from the verb *caraa*, or *karaa*, to read; the true ſenſe therefore of the word is, *the reading*, or that which ought to be read.

The alcoran is divided into 114 large portions, of very unequal length, which we call chapters, but the Arabians *ſowar*, which properly ſignifies a row, or ſeries. Theſe chapters, in the manuſcript copies, are not diſtinguiſhed by their numerical order, but by particular titles, which are ſometimes taken from ſome principal matter treated of, but generally from the firſt word of note that occurs.

Every chapter is ſubdivided into ſmaller portions, which we uſually call verſes, but the Arabians, *aiat*, which ſignifies ſigns or wonders; ſuch are the ſecrets of God, his attributes, works, &c. delivered in thoſe verſes.

The alcoran is univerſally allowed to be written in the pureſt and moſt elegant language, and to be the ſtandard of the Arabic tongue. The ſtile is, in general, beautiful and fluent, eſpecially where it imitates the prophetic manner and Scripture phraſes. It is conciſe and often obſcure, adorned with bold figures after the Eaſtern manner, enlivened with florid and ſententious expreſſions, and in many places, eſpecially where the majeſty and attributes of God are deſcribed, ſublime and magnificent.

The general deſign of the alcoran was to unite the profeſſors of the three different religions then followed in the populous country of Arabia, who, for the moſt part, lived promiſcuouſly, and wandered without guides, the far greater number being Pagans, and the reſt Jews and Chriſtians. In order to perform this, Mahomet pretended to be the ambaſſador of God, who, after the repeated admonitions, promiſes, and threatenings of former ages, had ſent him to eſtabliſh the true religion upon earth by force of arms, and appointed him chief pontiff in ſpiritual, and ſupreme prince in temporal affairs.

The great doctrine of the alcoràn is the unity of God; and to reſtore that fundamental principle of true religion, Mahomet pretended was the chief end of his miſſion. But there are many occaſional paſſages in it, relating to particular emergencies; for whenever any thing happened to perplex the falſe prophet, he always had recourſe to a new revelation: and hence there are ſeveral paſſages in the alcoran contradictory to one another. The Mahometan doctors, however, obviate any objection that might be raiſed on this ſubject, by ſaying, that God commanded ſeveral things in the alcoran, which for good reaſons were afterwards revoked and abrogated.

That Mahomet was really the chief contriver of the alcoran is beyond diſpute; though it is highly probable, that he had no ſmall aſſiſtance in this deſign from others; particularly from one Sergius, a Neſtorian monk, and a Jew named Abdallah Ebn Salâm. The Mahommedans however abſolutely deny that the alcoran was compoſed either by their prophet himſelf, or any other perſon; it being their general and orthodox belief, that it is not only of divine original, but even eternal and uncreated, remaining, as ſome of them expreſs it, in the very eſſence of God; that the firſt tranſcript has been from everlaſting by God's throne, written on a table of vaſt bigneſs; that a copy from this table, in one volume on paper, was, by the miniſtry of the angel Gabriel, ſent down to the loweſt heaven in the month of Ramadan, whence Gabriel revealed it by parcels, ſome at Mecca, and ſome at Medina, at different times during the ſpace of twenty years, as the exigency of affairs required; giving Mahomet, however, the ſatisfaction of ſeeing the whole once a year. They add, that this original copy was bound in ſilk, and adorned with gold and precious ſtones of paradiſe.

Hence it is eaſy to conceive, that this book is held in the higheſt eſteem and reverence among the Mahometans. They dare not ſo much as touch it without being legally purified. They read it with great attention and reſpect, never holding it below their girdles. They ſwear by it, conſult it on the moſt weighty occaſions, carry it with them to war, write ſentences of it in their banners, adorn it with gold and precious ſtones, and, knowingly, do not ſuffer it to be in the poſſeſſion of any of a different perſuaſion.

The interpreters of the alcoran unanimouſly agree, that the moſt eloquent paſſage of this whole book is that which is contained in the chapter Houd, where God is introduced bidding the waters of the deluge ceaſe. The words are theſe: "Earth, ſwallow up the waters; "Heaven, draw up thoſe thou haſt poured out: immediately the waters retreated, the command of God "was obeyed, the ark reſted on the mountains, and "theſe words were heard, Wo to the wicked!"

The ſame interpreters remark likewiſe, that the moſt excellent moral of the whole alcoran is comprized in this verſe of the chapter Aaraf: "Pardon eaſily, do "good to all, and contend not with the ignorant." They add, that Mahomet demanded of the angel Gabriel a more ample explication of this verſe, which was given him in theſe words: "Seek after him who drives "you away; give to him who takes from you; pardon "him who offends you; for God would have you plant "in your ſouls the ſeeds of the greateſt perfections." This morality is plainly borrowed from the evangelical precept of rendering good for evil.

ALCOVE, among builders, ſignifies a receſs, or part of a chamber, ſeparated by an eſtrade, or partition of columns, and other correſponding ornaments, in which either a bed of ſtate is placed, or ſeats to entertain company.

ALCYONIUM, in botany, a genus of ſubmarine plants, conſiſting of a rigid fibroſe ſubſtance, diſpoſed in various forms, and ſometimes coated over with a cruſt of a ſimilar, but more compact matter than the reſt. None of the ſpecies of this genus has either any viſible flowers or ſeeds.

ALCYONIUM is alſo uſed to ſignify various other ſubſtances, particularly a kind of white coral or aſtroites, frequently found foſſil in England.

ALDEBARAN, in aſtronomy, a ſtar of the firſt magnitude, called in Engliſh the Bull's-eye, as making the eye of the conſtellation Taurus. Its longitude is 6 deg. 32 min. 0 ſec. of Gemini, and its latitude 5 deg. 29 min. 49 ſec. ſouth.

ALDER-TREE, *Alnus*, in botany, the name of a genus of trees, whoſe characters are theſe: the flower is of the amentaceous kind, being compoſed of ſeveral apices, ariſing from four-leaved cups; theſe are affixed in a cluſtering manner to an axis, but theſe are barren. The young fruit appears in a different part of the tree, is of a ſquamoſe ſtructure, and loaded with embryo ſeeds; this finally increaſes in ſize, and becomes a regular fruit, containing a number of compreſſed ſeeds. *Miller's Dict.*

There are eight ſpecies of this plant enumerated by botanical authors; but the common alder is generally meant by the name.

There is a peculiar beneficial property belonging to this plant, for no beaſt will crop it, be it young or old, which ſaves the great charge of fencing it after planting. Their propagation is the ſame as the poplar, and, where the place is too wet for that, the alder will flouriſh and become large trees, pollards, or poles for hedges; in ſhort, there is none of the aquatic tribe will raiſe more money and ſooner than the alder, in wet meadow hedges, and in boggy, mooriſh ground, nor make ſtronger and quicker fences than this excellent plant.

This aquatic will thrive but poorly when raiſed from truncheons, nor much better from the wild-ſet or ſucker, which it produces but few of. But there is a way to do this much more to the purpoſe, and that is thus: firſt, prepare a bed of well-manured fine mould, then lay the full ripe ſeed at a due diſtance from the fire, or in the ſun, and it will cauſe them to open like the fir pine-apple; then ſow the ſeeds in the bed, and you will have abundance of young plants, that on ſetting out will be ſure to grow, if rightly managed: at Midſummer cut away the ſmall ſide-ſhoots of this tree, which will prevent their ſecond growth; but if they are large, you muſt not do it, becauſe it will then make the ſap run out too much, and damage the tree. This is of great conſequence; for, by ſo doing, the large ſide-arms are prevented in their growth, which often cauſes knobs and wens that leſſen the value of their wood. *Ellis's Timber-Tree Improved.*

ALDERMAN, the ſecond degree of nobility among the Anglo Saxons, and now the ſecond degree in cities or corporations; the mayor being the head, the alderman the next, and the common council the third, or loweſt degree.

The word is derived from the Saxon, *earlderman*; that is, a ſenior, or alderman, which, by degrees, came to ſtand for perſons of the greateſt diſtinction, becauſe ſuch were choſen to diſcharge the higheſt offices, being thoſe whoſe long experience rendered them moſt capable, and whoſe birth and fortune made them moſt conſpicuous; and as they were generally intruſted with the government of the counties, inſtead of ſaying the governor, it was ſaid the earlderman of ſuch a county; and by degrees this word came to ſignify the governor of a county, or city. While the heptarchy laſted, theſe officers were only during the king's pleaſure; at laſt they were for life, at leaſt for the moſt part. After the Danes were ſettled in England, the title of earlderman was changed into that of earl, and the Normans introduced that of count, which, though different in its original ſignification, meant however the ſame dignity.

At this time aldermen are aſſociates to the mayor, or civil magiſtrates of moſt of our municipal or corporate cities or towns, who form a kind of council, and regulate matters according to the policy of the place: ſometimes they alſo take cognizance of civil and criminal matters, but very rarely, and in particular caſes: their number is not limited, being in ſome places ſix, and others twenty-ſix, out of which are annually choſen the mayors, or chief magiſtrates, who, at the expiration of their mayoralty, devolve again into aldermen.

An alderman ought to be an inhabitant of the place, and reſident where he is choſe; and if he removes, he is incapable of doing his duty in the government of the place, for which he may be disfranchiſed.

ALE, a fermented liquor obtained from an infuſion of malt, and differing only from beer in having a leſs proportion of hops. See the article BREWING and FERMENTATION.

There are various ſorts of ale known in England, particularly pale and brown; the former is brewed from malt ſlightly dried, and is eſteemed more viſcid than the latter, which is made from malt more highly dried or roaſted.

Medicated ALES, thoſe wherein medicinal herbs have been infuſed, or added during the fermentation.

Gill ALE is that in which the dried leaves of gill or ground ivy have been infuſed. It is eſteemed abſterſive and vulnerary, and conſequently good in diſorders of the breaſt and obſtructions of the viſcera.

ALE-CONNER, an officer in London, who inſpects the meaſures uſed in public houſes.

There are four ale-conners, who are all choſen by the common-council of the city.

ALE-SILVER, a tax paid annually to the Lord-mayor of London, by all who ſell ale within the city.

ALEA, a ſurname given to Minerva by Aleus, king of Arcadia, who built a temple to that goddeſs in the city of Tegea, the capital of his kingdom. In that temple were preſerved the hide and tuſks of the wild boar Calydon.

ALECTO, one of the three furies of hell, the daughter of Acheron and Night. See FURIES.

The word is Greek, and ſignifies *envy*.

ALECTORIA, in natural hiſtory, a ſtone ſaid to be formed in the ſtomach, liver, or rather gall-bladder of old cocks; and to which the ancients attributed many fabulous virtues.

The word is Greek, and derived from αλεχτρυων, a cock.

ALECTROMANCIA, in antiquity, a ſpecies of divination performed by means of a cock, in the following manner: a circle was deſcribed on the ground, and divided into twenty-four equal portions, in each of which was written one of the letters of the alphabet, and a grain of wheat placed on each of the letters. This being finiſhed, a cock was turned looſe in the circle, and particular notice taken of the grains picked up by the bird; becauſe the letters under them being formed into a word, gave an anſwer to the queſtion.

The word is Greek, and compounded of αλεχτρυων, a cock, and μαντεια, divination.

A LEE, in navigation, is a term only uſed when the wind, croſſing or flanking the line of a ſhip's courſe, preſſes upon the maſts and ſails ſo as to make her incline to one ſide, which is called the lee-ſide: hence when the helm is moved over to this ſide it is ſaid to be a-lee, or hard a-lee.

ALEGAR, a kind of vinegar made of ale.

ALEMBIC, a chemical veſſel uſually made of glaſs, or copper, for condenſing the vapours that riſe in diſtillation: for the alembic is properly the head or upper part of the apparatus uſed in diſtilling; though it is often uſed to ſignify the whole. See the articles STILL, and DISTILLATION.

ALEPH, the name of the firſt letter in the Hebrew alphabet, from which the *alpha* of the Syrians and Greeks was formed.

The word properly ſignifies chief, prince, or thouſand. There are ſome of the Pſalms and other parts of Scripture which begin with Aleph, and the other verſes of them are continued with the other letters of the alphabet. The modern Jews uſe their letters as cyphers. Aleph ſtands for one; Beth for two; Gimel for three, &c.

ALEXANDRINE, in poetry, a kind of verſe, conſiſting of twelve, or thirteen ſyllables alternately; ſo called from a poem on the Life of Alexander, written in this kind of verſe by ſome French poet.

ALEXIPHARMICS, in medicine, are properly remedies for expelling or preventing the ill effects of poiſon:

but ſome of the moderns having imagined that the animal ſpirits, in acute diſtempers, were affected by a malignant poiſon, the term has been underſtood to mean medicines adapted to expel this poiſon by the cutaneous pores, in the form of ſweat. In this ſenſe, alexipharmics are the ſame as ſudorifics.

The word is formed from the Greek, αλεξω, to expel, and φαρμακον, a poiſon.

The moſt efficacious medicines of this kind owe the virtue of their operation to the power they poſſeſs of increaſing the ſyſtoltic motion of the heart, and the elaſticity of the arteries, as to the number and force of their vibrations, by which means a greater velocity being added to the circulation, they protrude the perſpirable matter through the outward and porous ſubſtances of the ſkin. This they perform either by a ſubtile, acid, hot oil; or by a volatile empyreumatic ſalt of an igneous nature; or by an acrid, reſinous ſalt, more or leſs fixed; or, laſtly, they act, and that very powerfully, by means of a very fine mineral ſalt and ſulphur, by which they rouſe the nervous fibres to a violent motion.

The moſt active ſudorifics, or alexipharmics, rarely find a place in medicine, and are not to be adminiſtered but with ſingular caution: for a ſweat never riſes in a healthful and natural ſtate, unleſs the blood is put into an extraordinary motion; nor, when this happens, is it a ſign of health, like inſenſible perſpiration, the matter of which is void of acrimony, watery, reſembling the nutritious juices, and almoſt deſtitute of taſte or ſmell, differing very much from ſweat, which is of a ſalt taſte, a fœtid ſmell, and approaches the nature of urine. Beſides, the ſudorifics excite a great commotion, and notable orgaſm; for they act not with moderation, but rapidity: whence it comes to paſs, that in bodies replete with blood, or contaminated ſerum, by impelling the fluids with too much violence to the ſmall and narrow veſſels, they bring on dangerous and acute ſymptoms, occaſioned by the inflammation and redundance of humours. But they are particularly hurtful, where the primæ viæ are obſtructed by a load of vitious humours, where the body is coſtive, and when they are adminiſtered immediately after a violent fit of anger. *Hoffman.*

ALEXITERIAL, among phyſicians, a term of much the ſame import with alexipharmic; though ſometimes uſed in a ſynonymous ſenſe with amulet.

ALFAQUES, among the Moors, the name generally uſed for their clergy, or thoſe who teach the Mahometan religion, in oppoſition to the Morabites, who anſwer to the Monks among the Chriſtians.

ALFET, in our old cuſtoms, denotes a cauldron full of boiling water, wherein an accuſed perſon, by way of trial or purgation, plunged his arm up to the elbow.

ALGA, in botany, a genus of ſubmarine plants, called in Engliſh, graſs-wreck, and compoſed of long ſlender leaves of a duſky-green colour, very much reſembling ſome kinds of graſs.

Authors enumerate ſeveral ſpecies of alga, the moſt conſiderable of which is the alga-marina, ſo much uſed in the glaſs trade.

ALGAROT, or ALGARET, in chemiſtry, an emetic powder prepared from regulus of antimony. See the article ANTIMONY.

ALGEBRA, a general method of reſolving problems by means of equations.

With regard to the etymology of the word algebra, it is much conteſted by the critics. Menage derives the word from the Arabic *algiabarat*, which ſignifies the reſtitution of any thing broken; ſuppoſing that the principal part of *algebra* is the conſideration of broken numbers. Others rather borrow it from the Spaniſh *algebriſta*, a perſon who replaces diſlocated bones; adding, that algebra has nothing to do with fraction. Some, with M. d'Herbelot, are of opinion, that algebra takes its name from Geber, a celebrated philoſopher, chemiſt, and mathematician, whom the Arabs call Giaber, and who is ſuppoſed to have been the inventor. Others from gefr, a kind of parchment made of the ſkin of a camel, whereon Ali and Giafar Sadek wrote, in myſtic characters, the fate of Mahometaniſm, and the grand events that were to happen till the end of the world. But others, with more probability, derive it from geber, a word whence, by prefixing the particle of, we have formed algebra, which is pure Arabic, and properly ſignifies the reduction of fractions to a whole number. However, the Arabs, it is to be obſerved, never uſe the word algebra alone, to expreſs what we mean by it; but always add to it the word *macabelah*, which ſignifies oppoſition and compariſon: thus *algebra-almacabelah*, is what we properly call algebra.

Some authors define algebra, the art of ſolving mathematical problems; but this is rather the idea of analyſis, or the analytic art. The Arabs call it, *the art of reſtitution and compariſon*, or *the art of reſolution and equation.* Lucas de Burgo, the firſt European who wrote of algebra, calls it, *regula rei & cenſus*, that is, the rule of the root and its ſquare; the root with them being called *res*, and the ſquare *cenſus*. Others call it *ſpecious arithmetic*, and others, *univerſal arithmetic.*

It is highly probable that the Indians or Arabians firſt invented this noble art; for it may reaſonably be ſuppoſed, that the ancient Greeks were ignorant of it, becauſe Pappus, in his Mathematical Collections, where he enumerates their analyſis, makes no mention of any thing like it; and, beſides, ſpeaks of a local problem, began by Euclid, and continued by Apollonius, which none of them could fully reſolve, which doubtleſs they might eaſily have done, had they known any thing of algebra.

Diaphantus was the firſt Greek writer of algebra, who publiſhed thirteen books about the year 800, though only ſix of them were tranſlated into Latin, by Xylander, in 1575; and afterwards, viz. anno 1621, in Greek and Latin by M. Bachet and Fermat, with additions of their own. This algebra of Diaphantus's only extends to the ſolution of arithmetical indeterminate problems.

Before this tranſlation of Diaphantus came out, Lucas Pacciolus, or Lucas de Burgo, a minorite friar, publiſhed at Venice, in the year 1494, an Italian Treatiſe of Algebra. This author makes mention of Leonardus Piſanus, and ſome others, of whom he had learned the art; but we have none of their writings. He adds, that algebra came originally from the Arabs, and never mentions Diaphantus; which makes it probable, that that author was not at that time known in Europe. His algebra goes no farther than ſimple and quadratic equations.

After Pacciolus appeared Stifelius, a good author, but neither did he advance any farther.

After him, came Scipio Ferreus, Cardan, Tartagila, and ſome others, who reached as far as the ſolution of ſome cubic equations. Bombelli followed theſe, and went a little farther. At laſt came Nunnius, Ramus, Schoner, Salignac, Clavius, &c. who all of them took different courſes, but none of them went beyond quadratics.

In 1590, Vieta entered upon the ſtage, and introduced what he called his *Specious Arithmetic*, which conſiſts in denoting the quantities, both known and unknown, by ſymbols or letters. He alſo introduced an ingenious method of extracting the roots of equations, by approximations, ſince greatly improved and facilitated by Raphſon, Halley, Simpſon, and others.

Vieta was followed by Oughtred, who, in his *Clavis Mathematica*, printed in 1631, improved Vieta's method, and invented ſeveral compendious characters, to ſhew the ſums, differences, rectangles, ſquares, cubes, &c.

Harriot, another Engliſhman, cotemporary with Oughtred, left ſeveral treatiſes at his death; and among the reſt, an Analyſis, on Algebra, which was printed in 1631, where Vieta's method is brought into a ſtill more commodious form, and is much eſteemed to this day.

In 1657, Des Cartes publiſhed his geometry, wherein he made uſe of the literal calculus and the algebraic rules of Harriot; and as Oughtred, in his *Clavis*, and Marin Ghetaldus, in his books of Mathematical Compoſition and Reſolution, publiſhed in 1630, applied Vieta's Arithmetic to elementary geometry, and gave the conſtruction of ſimple and quadratic equations; ſo Des Cartes applied Harriot's method to the higher geometry, explaining the nature of curves by equations, and adding the conſtructions of cubic, biquadratic, and other higher equations.

Des Cartes's rule for conſtructing cubic and biquadratic equations, was farther improved by Thomas Baker, in his *Clavis Geometrica Catholica*, publiſhed in 1684, and the foundation of ſuch conſtructions, with the application of algebra to the quadratures of curves, queſtions *de maximis & minimis*, the centrobaryc method of Guldinus, &c. was given by R. Sluſius, in 1668; as alſo by Fermat, in his *Opera Mathematica*; Roberval, in the *Mem. de Mathem. & de Phyſique*; and Barrow in his *Lect. Geomet.* In 1708 algebra was applied to the laws of chance and gaming, by R. de Montmort; and ſince by de Moivre and James Bernoulli.

Thus much for the progreſs of algebra. The elements of the art were compiled and publiſhed by Kerſy in 1671, wherein the ſpecious arithmetic, and the nature of equations, are largely explained, and illuſtrated by variety of examples: the whole ſubſtance of Diaphantus is here delivered, and many things added concerning mathematical compoſition and reſolution, from Ghetaldus. The like has been ſince done by Preſtet in 1694, and by Ozanam in 1703: but theſe authors omit the application of algebra to geometry, which defect is ſupplied by Guiſnee in a French Treatiſe expreſly on the ſubject, publiſhed in 1704; and l'Hopital, in his Analytical Treatiſe of the Conic ſections, in 1707. The rules of algebra are alſo compendiouſly delivered by Sir Iſaac Newton, in his *Arithmetica Univerſalis*, firſt publiſhed in 1707, which abounds in ſelect examples, and contains ſeveral rules and methods invented by the author.

Algebra is of two kinds, *numeral* and *literal*.

Numeral, or *Vulgar* ALGEBRA, is that of the ancients, which only had place in the reſolution of arithmetical queſtions. In this, the quantity ſought is repreſented by ſome letter or character; but all the given quantities are expreſſed by numbers.

Literal, or *Specious* ALGEBRA, or the *New* ALGEBRA, is that wherein the given or known quantities, as well as the unknown, are all expreſſed or repreſented by their ſpecies, or letters of the alphabet.

This eaſes the memory and imagination of that vaſt ſtreſs or effort required to keep ſeveral matters, neceſſary for the diſcovery of the truth in hand, preſent to the mind: for which reaſon this art may be properly denominated metaphyſical geometry. Specious algebra is not, like the numeral, confined to certain kind of problems; but ſerves univerſally for the inveſtigation or invention of theorems, as well as the ſolution and demonſtration of all kinds of problems, both arithmetical and geometrical. The letters uſed in algebra do each ſeparately repreſent either lines or numbers, as the problem is arithmetical or geometrical; and together, they repreſent planes, ſolids, and powers, more or leſs high, as the letters are in a greater or leſs number: for inſtance, if there be two letters, $a\,b$, they repreſent a rectangle, whoſe two ſides are expreſſed, one by the letter a, and the other by b; ſo that by their mutual multiplication they produce the plane $a\,b$. When the ſame letter is repeated twice, as $a\,a$, they denote a ſquare. Three letters $a\,b\,c$, repreſent a ſolid, or a rectangle parallelepiped, whoſe three dimenſions are expreſſed by the three letters a, b, c; the length by a, the breadth by b, and the depth by c; ſo that by their mutual multiplication they produce the ſolid $a\,b\,c$.

As the multiplication of dimenſions is expreſſed by the multiplication of letters, and as the number of thoſe may be ſo great as to become incommodious; the method is, only to write down the root, and on the right hand to write the index of the power, that is, the number of letters whereof the power to be expreſſed does conſiſt; as a^2, a^3, a^4, a^5; the laſt of which ſignifies as much as a, multiplied five times into itſelf; and ſo of the reſt.

For the ſymbols, characters, &c. uſed in algebra, with their application, &c. ſee the articles CHARACTER, and QUANTITY.

For the method of performing the ſeveral operations in algebra, ſee ADDITION, SUBTRACTION, and MULTIPLICATION.

ALGEBRA has alſo been applied to the conſideration and calculus of infinites; from whence a new and extenſive branch of knowledge has ariſen, called the Doctrine of Fluxions, or Analyſis of Infinites, or the *Calculus Differentialis*. See FLUXIONS. The principal authors on this ſubject, ſee under the article ANALYSIS.

ALGEBRAICAL, ſomething that relates to algebra. Thus we ſay, algebraical characters, or ſymbols, curves, ſolutions, &c. See CHARACTER.

ALGEBRAICAL *Curve* is a curve wherein the relation of the abſciſſes to the ordinates may be defined by an algebraical equation. Theſe are alſo called geometrical lines, or curves. Algebraical curves ſtand contradiſtinguiſhed to mechanical or tranſcendental ones. See MECHANICAL and TRANSCENDENTAL.

ALGEBRAIST, a perſon ſkilled in the ſcience of algebra.

ALGENEB, a fixed ſtar of the ſecond magnitude, in Perſeus's right ſide; its longitude is 27°, 46′, 12″, of Taurus, and its latitude 30°, 05′, 28″, north, according to Mr. Flamſtead's catalogue.

ALGOIDES, a name uſed by Vaillant for a genus of plants, called, by Linnæus, zannichellia. See ZANNICHELLIA.

ALGOL, a fixed ſtar of the third magnitude, called Meduſa's Head, in the conſtellation Perſeus; its longitude is 21°, 50′, 40″, of Taurus, and its latitude 22°, 23′, 47″, north, according to Flamſtead's catalogue.

ALGOR, among medical writers, implies an unuſual coldneſs or chilneſs in any part of the body.

ALGORITHM, the art of numerical computation, and particularly means the five rules of arithmetic, called numeration, addition, ſubtraction, multiplication, and diviſion.

The word is Arabic, and properly ſignifies the art of computing with accuracy and facility.

The Spaniſh writers uſe the word algorithm to ſignify the practice of algebra.

ALGUAZIL, in the Spaniſh police, an officer whoſe buſineſs it is to carry the decrees of the judges into execution.

The word is originally Arabic, and received by the Spaniards from the Saracens, or Moors, who reigned a long time in Spain.

ALHANDEL, the Arabic name for colocynth. See COLOCYNTH.

ALHEAL, in botany, a name given to ſeveral plants, on account of their medicinal virtues. See PANAX.

ALHIDADE, or ALIDADE, the Arabic name of the index or diopter of a mathematical inſtrument for taking heights and diſtances.

ALIAS, a ſecond or further writ iſſued from the courts of Weſtminſter, after a capias, &c. ſued out without effect.

ALIBI, in law, implies the abſence of the accuſed party; or his being at a diſtance from the place where the fact was committed, at the very time mentioned in the indictment.

The word is Latin, and properly ſignifies elſewhere.

ALIEN, in law, implies a perſon born in a ſtrange country, not within the king's allegiance, in contradiſtinction to a denizen, or natural ſubject.

The word is formed from the Latin, *alius*, another; q. d. one born in another country.

An alien is incapable of inheriting lands in England, till naturalized by an act of parliament. No alien is entitled to vote at the election of members of parliament; nor can he enjoy any office, or be returned on any jury, unleſs where an alien is party in a cauſe, when the inqueſt is compoſed of an equal number of denizens and aliens.

The reaſons for eſtabliſhing theſe laws were, that every man is preſumed to bear faith and love to that prince and country where he received protection during his infancy; and that one prince might not ſettle ſpies in another's country; but chiefly that the rents and revenues of the country might not be drawn to the ſubjects of another.

Some have thought that the laws againſt aliens were introduced in the time of Henry II. when a law was made at the parliament of Wallingford, for the expulſion of ſtrangers, in order to drive away the Flemings and Picards, introduced into the kingdom by the wars of king Stephen. Others have thought that the original of this law was more ancient; and that it is an original branch of the feudal law; for by that law no man can purchaſe any lands but he muſt be obliged to do fealty to the lords of whom the lands are holden; ſo that an alien that owned a previous faith to another prince, could not take an oath of fidelity in another ſovereign's dominions.

Among the Romans, only the Cives Romani were eſteemed freemen; but, when their territories increaſed, all the Italians were made free, under the name of Latines, though they had not the privilege of wearing gold rings, till the time of Juſtinian. Afterwards all born within the pale of the empire were conſidered as citizens. *Cunningham's Law Dict.*

Alien-Duty, an impoſt laid on all goods imported by aliens, over and above the duty for ſuch goods imported by Britiſh ſubjects, and on Britiſh bottoms.

Alien Priories, a kind of inferior monaſteries, formerly very numerous in England, and ſo called from their belonging to foreign abbies.

ALIENATION, in law, implies the act of making over a perſon's property in lands, tenements, &c. to another.

ALIFORMIS, in anatomy, the name of a pair of muſcles ariſing from the pterygoide bones, the proceſs of the os cuneiforme, with a beginning partly nervous, and partly fleſhy, and ending in the neck of the lower jaw.

The word is Latin, and compounded of *ala*, a wing, and *forma*, reſemblance.

Aliformis Processus, a name ſometimes given to the prominence of the os cuneiforme.

ALIMENT, in a general ſenſe, implies, whatever contributes to the nouriſhment of an animal or vegetable body.

Aliment, among phyſicians, whatever is capable of nouriſhing an animal body.

The loſs which we ſuſtain daily makes it neceſſary that it ſhould be repaired by ſubſtances analogous to thoſe of our body, ſuch as aliment and drink, the ſtimulus to which is hunger and thirſt; wherefore it is neceſſary to know in general their kinds and principal qualities, in order to make a proper choice.

Solid **Aliments** are taken from ſeeds, fruits, leaves, ſtalks, and roots; of all which the ſeed is the moſt laboured, and contains a mealy and milky ſubſtance; from whence a ſoft oil may be drawn, friendly to human bodies.

The principal and moſt general aliment is bread, which is made of wheat, rye, barley, and Turkey corn. That of wheat is moſt nouriſhing; barley is dry, and rye is laxative. The cruſt is moſt eaſy of digeſtion; the crum is more oily and heavy.

The other farinaceous ſubſtances are beans, peaſe, and lentils, which nouriſh much, but are heavy, windy, and viſcous; and conſequently, by conſtant uſe are apt to cauſe obſtructions.

Rice, barley, and oats, properly prepared, are moiſtening, emollient, and reſtorative. Nuts, almonds, and cheſnuts, are full of a nouriſhing oil, but are hard of digeſtion.

Fruits which are pulpous and tart, abound with water, and are refreſhing, moiſtening, and ſedative; appeaſing the too rapid motion of the blood, quenching thirſt, digeſting eaſily; ſuch as ſtrawberries, gooſeberries, currants, apricots, and figs; as alſo peaches, pears, and apples. Theſe ſhould be eaten ripe, and in a ſmall quantity; but they are windy, and therefore are beſt boiled, or baked, and made into ſweetmeats.

Pot-herbs and roots are leſs nouriſhing than the mealy ſubſtances. Lettuce, ſuccory, ſorrel, purſlain, refreſh, moiſten, looſen the belly, and appeaſe the orgaſm of the blood. Artichokes, cellery, creſſes, aſparagus, parſley, are a little heating. Trufles, champignions, garlic, ſhallots, pepper, cloves, nutmegs, muſtard, heat very much.

Animals are either terreſtrial, volatile, aquatic, or amphibious. Theſe differ greatly with regard to their kind, age, manner of living, and ſubſtance.

Fiſh nouriſh the leaſt of all animals, becauſe they abound with phlegm. Young animals have a plenty of a ſoft and nouriſhing juice, but that of the older is more nouriſhing. The juices of the old are ſpirituous, gelatinous, and agreeable to the taſte; but the fleſh is hard and difficult of digeſtion.

Wild animals are more light and digeſtible than the tame. Their white parts contain a very ſucculent ſubſtance of tender fibres, and yield a ſoft aliment, and are eaſy of digeſtion.

Liquid **Aliments** are milk, eggs, chocolate, ſoops, broths, &c.

Milk is properly nothing but chyle, and conſequently does not need any great preparation in the ſtomach. It is a good aliment for perſons whoſe ſtomachs are languid, and for children.

New laid eggs yield very good nouriſhment, are eaſy of digeſtion, and agree with perſons of exhauſted bodies, and thoſe that are old.

Chocolate is a very agreeable liquor, and nouriſhing; ſtrengthens the ſtomach, reſtores the body, helps the digeſtion, and ſoftens ſharp humours. It is proper for perſons of a weak ſtomach.

Drinks reſtore the fluid parts of the body; they are a vehicle for other aliments, and render the digeſtion eaſy. Water is the principal, moſt ſalutary, and moſt neceſſary for life, of which ſoft water is the beſt, and which lathers readily with ſoap. It is the greateſt diſſolvent that we have. Water alone has cured many indiſpoſitions, but too much relaxes and weakens the ſolids, and cauſes many infirmities.

Wine taken too freely is prejudicial to health; but moderately, it ſtrengthens the ſolids, and facilitates digeſtion; its exceſs, as well as all other ſpirituous liquors, harden the fibres, affect the nerves, diminiſh the ſecretions, deſtroy the appetite, and induce chronical diſeaſes.

That malt liquor is accounted beſt that is ſpecifically lighteſt, and not ſaturated with too groſs a ſubſtance, for then it does not offend the ſtomach, but paſſes readily through the emunctories of the body, and particularly by urine. The beſt kind of beer does not render the head heavy, nor grow ſour upon the ſtomach, nor inflates the hypochondria. This depends greatly upon the goodneſs of the water, the proper boiling of the ingredients, and a due fermentation.

All thick, muddy, heavy, ſtale beer not ſufficiently boiled, offends the head, generates wind, obſtructions, the ſtrangury, aſthma, and the colic.

Tea promotes perſpiration, ſtrengthens and clears the ſtomach, helps digeſtion.

Coffee is taken after dinner to haſten the digeſtion, and allay the fumes of wine. Moderately uſed it ſubtilizes the humours, but its exceſs agitates the blood, cauſes watching, and promotes hæmorrhages.

Broth, or ſoup, abounds with a ſoft, moiſtening, and nouriſhing jelly, whence they are good reſtoratives. Meat that is roaſted contains an excellent nouriſhing juice, the moiſt parts being diſſipated by the fire.

Things that are fried are only proper for good ſtomachs.

Spice, vinegar, &c. in a ſmall quantity, may correct the faults of the aliment, but are pernicious when uſed to create an appetite; whence made-diſhes are commonly bad. The appetite, excited by the quality and diverſity of the viands, provokes perſons to eat more than they ought; which cauſes indigeſtions, frequent indiſpoſitions, and ſometimes dangerous diſeaſes: therefore the ſkill of the cooks of theſe times contribute greatly to ſhorten their maſters lives.

The method of preſerving health therefore is to live upon plain ſimple aliment, lightly ſeaſoned, and in quantity agreeable to the age, ſtrength of the ſtomach, ſeaſon of the year, ſex, conſtitution, and chiefly to what nature has found by experience to require: for it is as great a fault to take too much as too little. Perfect digeſtion is the beſt rule for regulating a meal, eſpecially if the perſon is more briſk and lively after a repaſt than before.

We have examples of many perſons, who by their temperance have lived to a very advanced age; wherefore, thoſe that are fond of life and health ſhould imitate their regimen. Exceſſes in eating and drinking are extremely pernicious.

Perſons of a delicate conſtitution, or who are juſt recovered

covered from a diſeaſe, ſhould uſe ſoſt light aliments agreeable to the ſtomach; for they make the beſt chyle.

Acid, tenacious, viſcous aliment, pies of all kinds; things that are fat, and of a blackiſh ſubſtance, are generally unfit for chylification, or render the chyle bad.

Strong robuſt, young perſons, who uſe much exerciſe, ought to eat more than others; and may be more free with the groſſer kind of aliment; for their ſtomachs being ſtrong, the lighter kind of food would digeſt too eaſily, and be diſſipated too ſoon.

Children whoſe ſtomachs are weak, and veſſels fine, ought to uſe a light, ſlender, thin, ſoſt aliment, eaſy of digeſtion; wherefore infants ſhould be fed with fluid milk, to avoid cauſing obſtructions in their fine and delicate veſſels. Conſequently, the milk of a nurſe newly brought to bed is more agreeable to infants than that of one who has been delivered five or ſix months, and whoſe milk begins to have too great a conſiſtence. Nurſes ſhould obſerve an exact regimen, and ſhun all ſorts of violent paſſions; for they diſturb digeſtion, and communicate their bad effects to their children. When infants are weaned, they ſhould not be accuſtomed to ſpirituous liquors and ſtrong food, eſpecially the ſalt and ſmoke-dried, which are hard of digeſtion, and yield bad nouriſhment. The beſt method is to eat little at a time and often.

In old age the fluids are more thick, the ſecretions ſlow, and the ſolids more ſtiff than in youth; wherefore they require leſs food, and of a more ſoſt, nouriſhing, moiſtening kind, eaſy of digeſtion, and not too much at a time, eſpecially in the evening.

At all times of life, but eſpecially in old age, the conſtant and immoderate uſe of ſalt and ſmoke-dried meat, acid and aromatic vegetables, as well as ſpirituous liquors, tend to harden and to ſtiffen the parts of the body, inſtead of affording good nouriſhment; beſides, the digeſtion of theſe aliments is difficult, and render the blood ſo acrid, as to hurt the capillary veſſels.

However, an acquired habit is hard to be left off, and we find many perſons enjoy a good ſtate of health when their meat and drink are very indifferent, becauſe they are become cuſtomary, and they are apt to fall ſick when they attempt to change their manner of life; for cuſtom is a ſecond nature: all great changes ought to be brought about inſenſibly.

For this reaſon, it is good not to contract a habit of any kind; wherefore, perſons of a good conſtitution ſhould live in a various manner, and refuſe no kind of aliment; and ſhould ſometimes be in town, and ſometimes in the country; ſhould uſe much exerciſe, and ſhould even now and then exceed the exact bounds of moderation, and at the other times omit a meal now and then.

Hunger ſhews the beſt time of eating, but cuſtom confines us to certain hours. Perſons who find no inconvenience from dining and ſupping every day, need not change their manner of life. In youth, wherein there is a great diſſipation, and in age, where ſtrength is wanting, and when little is eaten at a time, ſomething taken between meals is not amiſs. However, it is neceſſary to obſerve, that when the ſtomach is bad, perſons ſhould not begin to eat again till the laſt meal is digeſted.

When a perſon is greatly fatigued, and his ſpirits diſſipated, it will be neceſſary to reſt before eating. In caſes of diſtreſs and ſorrow, the aliment ſhould be very light, and ſmall in quantity, becauſe the ſtomach is weak at thoſe times.

In the ſummer, when the ſpirits and fluid part are apt to evaporate, the aliment ſhould be light, moiſt, fluid, and eaſy of digeſtion, to repair the loſs with greater ſpeed; whereas in winter the ſtomach will admit of groſſer food.

ALIMENTARY, an epithet applied to whatever belongs to aliment or food.

ALIMENTARY *Duct*, in anatomy, a name given by ſome to the inteſtines, on account of the aliments paſſing through them.

ALIMENTARY *Duct* is alſo ſometimes uſed for the thoracic duct. See THORACIC *Duct*.

ALIMONY, in law, implies that allowance which a married woman ſues for, and is entitled to, upon any occaſional ſeparation from her huſband.

The word is Latin, *alimonia*, and properly ſignifies nouriſhment or maintenance.

ALIQUANT *Part* in arithmetic, is that number which cannot meaſure any number exactly without ſome remainder, as 7 is an aliquant part of 16, for twice 7 wants 2 of 16, and three times 7 exceeds 16 by 5.

ALIQUOT *Part*, is that part of a number or quantity, as will exactly meaſure it without any remainder, as 2 is an aliquot part of 4, 3 of 9, 4 of 16, &c.

All the aliquot parts of any number may be found by the following rule: Divide the given number by its leaſt diviſor, and the quotient by its leaſt diviſor, until you get a quotient that cannot be farther diviſible, and you will have all the prime diviſors, or aliquot parts of that number; then, if every two, three, four, &c. of theſe diviſors be multiplied into themſelves, the products will be the ſeveral conjoined diviſors, or aliquot parts of that number. As ſuppoſe it were required to find all the aliquot of 60, divide it by 2, and the quotient 30 by 2, and the quotient 15 by 3, and there remains the indiviſible quotient 5. Therefore all the prime aliquot parts are 1, 2, 3, 5, and the compound ones from the multiplication of every 2, are 4, 6, 10, 15, and from that of every three, 12, 20, 30. In like manner, the aliquot parts of 350, will be found to be 1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 15, 18, 20, 24, 30, 36, 40, 45, 60, 72, and 180; for all the prime aliquot parts are 1, 2, 3, 5, and thoſe from the multiplication of every 2 of theſe are 4, 6, 2, 9, 10, 15, thoſe from every 3 are 8, 12, 18, 20, 30, 45, thoſe from every 4, 24, 36, 40, 60, 90; and thoſe from every 5, 72, 120, 180.

ALKAHEST, or ALCAHEST, among chemiſts, implies an univerſal ſolvent, or that will diſſolve all bodies without exception.

The word ſeems to have been coined by Paracelſus, it being derived from no language, and was unknown before the time of that author.

Paracelſus, and the elder Van Helmont, have expreſly declared in their writings, that there is a certain fluid in nature, capable of reducing all ſublunary bodies, as well homogeneous as mixed, into their ens primum, or original matter whereof they are compoſed; or into an uniform, equable, and portable liquor, that will unite with water, and the juices of our bodies, yet retains its ſeminal virtues; and if mixed with itſelf again, will thereby be converted into pure elementary water: whence they imagined this menſtruum could at length reduce all things to water, which, itſelf, was incapable of any farther change. Such a declaration as this, ſeconded by the aſſeveration, or oath of Helmont, who religiouſly ſwears himſelf poſſeſſed of the ſecret, cauſed all the ſucceeding chemiſts ſollicitouſly to turn their thoughts and labours to find out ſuch a noble menſtruum. And the famous Mr. Boyle was ſo fond of it, that he frankly acknowledges he had rather have been maſter thereof than of the philoſopher's ſtone; as indeed, it were a thing more to be wiſhed for than the power of tranſmuting metals. That great philoſopher, however, ingenuouſly tells us, he had not the good fortune to poſſeſs it.

Now it is eaſy to conceive, that all bodies might originally grow from ſome firſt matter, which was once in a fluid form. Thus the primitive matter of gold is, perhaps, nothing more than a ponderous fluid; which, from its own nature, or a ſtrong attraction between its parts, afterwards acquires a ſolid form. The aſſertion therefore, of Paracelſus and Helmont carries a ſhew of probability with it, when they ſay there is ſome univerſal ens, or original matter, that reſolves all bodies into their ens genitale, or the primitive ſubſtance whereof they were at firſt created. So many are the authors who have treated of this ſubject, that a library might almoſt be collected of the books written upon the alkaheſt. Weiderſelt, in his treatiſe *De Secretis Adeptorum*, has made a collection of all the opinions that have been entertained about it; but it is manifeſt from his writings, that himſelf never ſaw the thing. Pantaloon alſo, with Philalethes, Tachenius, Ludovicus, and a thouſand others, treat of the ſame ſubject. But none of them ſpeak to the purpoſe, nor declare themſelves poſſeſſed of the ſecret, except Paracelſus and Helmont, who are the original authors, and upon whoſe writings the reſt have made idle comments, or fallen into ſome whimſical conceit as to this grand ſolvent.

Many have pretended to this extraordinary menſtruum. Starkey, that excellent chymiſt, diſciple to Helmont, and friend to Mr. Boyle, was, as well as ſome others, of opinion, that it might be a preparation from putrified urine. They were led to this by thoſe paſſages of Helmont's works, wherein he expreſſes himſelf to this effect: "Wiſdom deſpiſes thoſe who are averſe to work "upon putrified urine." And ſpeaking of the ludus, that is the human calculus, he ſays, "Putrified urine "diſſolves the ſtone." But he could not mean by theſe, or the like expreſſions, that putrified urine was really the alkaheſt; becauſe urine, in what manner ſoever it be treated, always has ſomething ſulphureous or ſaline mixed therewith; and conſequently would give a foulneſs to the bodies it diſſolved, and be altered by them; which is directly oppoſite to the nature of the alkaheſt. And ſpirit of urine being an alkali, is for that reaſon expreſly declared by Helmont not to be the thing. All the other preparations from urine would likewiſe ſuffer a change. The oil of urine may be tranſmuted, and the offa alba Helmontiana is alterable by acids; characters no way comporting with the alkaheſt. The like we muſt alſo ſay of phoſphorus, which has therefore been taken for the alkaheſt, becauſe Helmont deſcribes that univerſal ſolvent as a thick, ſhining, fire-water; but this will unite with aqua-fortis, fly off, and loſe its virtue in the air, flame, and be entirely conſumed by the fire, mix with oils, and not fix mercury. Others will have it to be a preparation from ſalt of tartar; but Helmont is expreſs to the contrary. "Whoever, ſays he, "practiſes the art of phyſic, and has a concern for his "neighbour's welfare, let him learn to prepare ſuch a "ſolvent as is homogeneal, unchangeable, and able to "reduce all its objects to their original liquid matter, "whereby he will obtain the very internal eſſences of "things, and ſee their qualities and diſpoſitions; but "ſuch as cannot attain to this ſecret, ought, at leaſt, "to learn how they may render ſalt of tartar volatile; "by means whereof they may make uncommon diſſo"lutions." This ſalt alſo will receive a change both from acids and oils.

After all, the principal chymiſts are now perſuaded that no ſuch ſolvent ever exiſted in nature: at leaſt, that no mortal was ever poſſeſſed of the ſecret. This, indeed, ſeems ſufficiently evident from the very nature of the alkaheſt; for if it will diſſolve all bodies, it will be impoſſible to be kept in any veſſel. Van Helmont therefore cannot be believed, when he aſſerts that he had a bottle filled with alkaheſt lent him; becauſe it could not be contained in any bottle, as it would diſſolve the veſſel and be loſt.

ALKALI. See the article ALCALI.

ALKANET, in botany, the Engliſh name of a genus of plants called anchuſa. See ANCHUSA.

ALKEKENGI, winter-cherry, in botany, a low, and ſomewhat hairy plant, with unbranched ſtalks; large heart-ſhaped acuminated leaves, ſtanding in pairs at the joints, and whitiſh bell-ſhaped flowers, riſing in the boſoms of the leaves, divided about the edges into five ſegments: the flower-cup changes into a pentagonal capſule or bladder, which, burſting, diſcovers in its bottom a red fruit like a cherry, containing numerous ſmall ſeeds with a juicy pulp. It grows wild in ſome parts of Europe, and ſpreads ſo much in our gardens as not to be eaſily extirpated. The fruit ripens about the beginning of October, and ſometimes continues to near the end of December; after which the plant dies to the ground.

Winter-cherries have an acidulous not unpleaſant taſte, mixed with, or followed by a ſlight bitterneſs: the covering in which they are incloſed, has a ſtrong pungent bitterneſs, with which it is apt to impregnate the cherries, unleſs ſome care is taken in gathering them. As medical writers in general ſpeak of this fruit as being very bitter, we may preſume that it has been often uſed with this extraneous bitter impregnation.

Thoſe cherries are accounted powerful diuretics, operating without heat or irritation, and which may therefore be ventured on in inflammatory diſtempers: five or ſix of the cherries in ſubſtance, or an ounce of the expreſſed juice are directed for a doſe. They are ſaid to be, in ſome places, eaten, among common people, by handfuls, and with good ſucceſs, againſt ſuppreſſions of urine, and for promoting the expulſion of mucus and gravel. Mr. Ray tells us of a gouty perſon who was cured, and kept free from returns of his diſorder, by taking eight of theſe cherries at each change of the moon; and that the operation of the medicine procured a diſcharge of extremely fetid matter by urine. The cherries may be dried ſo as to be pulverable, or the depurated juice inſpiſſated with a gentle heat to the conſiſtence of a rob, or extract, and in this ſtate preſerved for uſe. *Lewis's Hiſtory of the Materia Medica.*

ALKERMES, a compound cordial medicine, formerly much in uſe, the principal ingredient of which is kermes. See KERMES.

ALKORAN. See ALCORAN.

ALL-SAINTS, a feſtival obſerved by moſt denominations of Chriſtians, in commemoration of all the ſaints in general. It is celebrated on the firſt of November.

ALL-SOULS, a feſtival kept on the ſecond of November, in commemoration of the faithful deceaſed.

ALLA, or ALLAH, the name of God among the profeſſors of the Mahometan religion. It properly ſignifies the adorable Being.

The word is Arabic, and derived from *alah*, to adore.

ALLANTOIS, or ALLANTOIDES, in anatomy, a veſicle inveſting the fœtus of ſeveral animals, and containing an urinous liquor, ſuppoſed to be conveyed thither from the urachus.

The word is Greek, and compounded of αλλας, a gut, and ειδος, reſemblance.

Anatomiſts are not agreed whether the allantois has or has not any exiſtence in the human ſpecies.

ALLAY. See the Article ALLOY.

ALLEGATION, in law, implies the producing inſtruments, or deeds, for proving the truth of ſomething litigated before the court.

ALLEGIANCE, in law, ſignifies the obedience which every ſubject owes to his lawful ſovereign.

The word is formed from the Latin, *allegiantia*, and derived from *allego*, to admit.

Allegiance is either natural, acquired, or local.

Natural ALLEGIANCE is that which every ſubject born ought to pay immediately upon his birth.

Acquired ALLEGIANCE is that which a perſon naturalized, or made a denizen owes to the king.

Local ALLEGIANCE is that which a perſon, on his entering the dominions of another prince, ought to pay for his protection.

Oath of ALLEGIANCE is that taken by the ſubject, and in which he acknowledges the king a temporal prince.

ALLEGORICAL, ſomething belonging to, or partaking of, the nature of an Allegory. See ALLEGORY.

ALLEGORICAL *Poetry*, is that wherein ſome uſeful truth is conveyed under the veil of an allegory.

Could truth engage the affections of mankind in her native and ſimple dreſs, ſhe would require no ornament, or aid from the imagination; but her delicate light, though lively in itſelf, and clear to the moſt diſcerning, does not ſtrike the ſenſes of the multitude ſo as to ſecure their eſteem and attention; the poets therefore dreſſed her up in the manner in which they thought ſhe would appear the moſt amiable, and called in allegories and airy diſguiſes as her auxiliaries in the cauſe of virtue.

The human mind is ever enterpriſing, and in continual ſearch of ſomething new; which obtained, loſes of its value by being known, and yields but little gratification. Whatever excites curioſity will always delight, and whatever delights will ſecure to itſelf a portion of the mind, till we are urged to the purſuit of ſomething ſtill more new and more engaging: for it is true, tho' an unfavourable obſervation, that the mind of man (ever rapacious and never ſatisfied) is always coveting what it never fully enjoys; as kings conquer nations they never mean to poſſeſs. Our pleaſures, therefore, are for the moſt part made up of expectation and novelty; and he who would inſtruct effectually, muſt give us ſomething to hope, and ſomething to excite new and pleaſing ideas in the imagination. He muſt not only enlighten and improve the underſtanding, but addreſs ſuch images to the mind as will keep it ſteady in the purſuit of truth. And this is the ſource, and indeed the buſineſs, not only of poetry, but of all the ſciences that depend upon fancy, and which, as we have already obſerved, the weakneſs of human nature has rendered neceſſary; for men are ſo ſeldom affected with the ſimple and invariable beauty of virtue, that it is of little conſequence to point out truth, unleſs we repreſent her in the moſt agreeable form, and render her ſo endearing, that ſhe may not only ſecure their attention for a time, but by her lovelineſs, call back the mind occaſionally to a retroſpection and new contemplation of her beauties; and this is often done by a ſeaſonable uſe of the allegory, through which, as through a delightful wilderneſs variegated with flowers, lawns, ſtreams, and umbrageous trees, we are content to be led to truth, when we ſhould have little inclination to purſue the known and beaten track that afforded us no ſuch entertainment.

The power which allegorical poetry has over the mind may be felt by reading the poets who have written in this manner; but eſpecially Spenſer, who had a bold and boundleſs fancy, and was a moſt admirable painter, or imager of the virtues and vices. His deſcriptions are, indeed, rich and luxuriant; but, if we miſtake not, it is principally owing to his juſt and beautiful allegories (the creatures of his own fancy) that he has been deemed the father of Engliſh poetry, and led more young minds into the ſtudy of this bewitching art than any other poet. Cowley, Milton, and Dryden, are ſaid to have caught their firſt flame from him, and the laſt has been more frequent and full in the praiſe of Spenſer than of any other poet. But enough has been ſaid on the excellency and uſe of the allegory; it is neceſſary now that we explain what we mean by allegorical poetry, and lay down ſuch rules as ought to be obſerved in theſe compoſitions.

An allegory is a fable or ſtory, in which, under the diſguiſe of imaginary perſons or things, ſome real action, or inſtructive moral, is conveyed to the mind. Every allegory, therefore, has two ſenſes, the one literal, and the other myſtical; the firſt has been aptly enough compared to a dream or viſion, of which the laſt is the true meaning or interpretation.

From this definition of allegorical poetry the reader will perceive that it gives great latitude to genius, and affords ſuch a boundleſs ſcope for invention, that the poet is allowed to ſoar beyond all creation; to give life and action to virtues, vices, paſſions, diſeaſes, and natural and moral qualities; to raiſe floating iſlands, inchanted palaces, caſtles, &c. and to people them with the creatures of his own imagination.

> The poet's eye, in a fine frenzy rolling,
> Doth glance from heav'n to earth, from earth to heav'n;
> And, as imagination bodies forth
> The forms of things unknown, the poet's pen
> Turns them to ſhape, and gives to airy nothing
> A local habitation and a name. SHAKESPEARE.

But whatever is thus raiſed by the magic of his mind, muſt be viſionary and typical, and the myſtical ſenſe appear obvious to the reader, and inculcate ſome moral or uſeful leſſon in life; otherwiſe the whole will be deemed rather the effects of a diſtempered brain, than the productions of real wit and genius. The poet, like Jaſon, may ſail to parts unexplored, but will meet with no applauſe if he returns without a golden fleece; for theſe romantic reveries would be unpardonable, but for the myſtical meaning and moral that is thus artfully and agreeably conveyed with them; and on which account only, the allegory is indulged with a greater liberty than any other ſort of writing.

The ancients conſidered this ſort of allegory as the moſt eſſential part of poetry, and undoubtedly it is; for the power of raiſing images of things not in being, giving them a ſort of life and action, and preſenting them, as it were, before your eyes, was thought to have ſomething in it like creation: but then, in ſuch compoſitions, they always expected to find a meaning couched under them of conſequence; and we may reaſonably conclude that the allegories of their poets would never have been handed down to us, had they been deficient in this reſpect.

As the fable is the part immediately offered to the reader's conſideration, and intended as an agreeable vehicle to convey the moral, it ought to be bold, lively, and ſurpriſing, that it may excite curioſity and ſupport attention; for, if the fable be ſpiritleſs and barren of invention, the attention will be diſengaged, and the moral, however uſeful and important in itſelf, will be little regarded.

There muſt likewiſe be a juſtneſs and propriety in the fable, that is, it muſt be cloſely connected with the ſubject on which it is employed; for notwithſtanding the boundleſs compaſs allowed the imagination in theſe writings, nothing abſurd or uſeleſs is to be introduced. In epic poetry ſome things may, perhaps, be admitted for no other reaſon but to ſurpriſe, and to raiſe what is called the wonderful, which is as neceſſary to the epic as the probable; but in allegories, however wild and extravagant the fable and the perſons introduced, each muſt correſpond with the ſubject they are applied to, and, like the members of a well-written ſimile, bear a due proportion and relation to each other: for we are to conſider that the allegory is a ſort of extended or rather multiplied ſimile, and therefore, like that, ſhould never loſe the ſubject it is intended to illuſtrate: whence it will appear, that the genius and fancy are here inſufficient without the aid of taſte and judgment; theſe firſt, indeed, may produce a multitude of ornaments, a wilderneſs of ſweets, but the laſt muſt be employed to accommodate them to reaſon, and to arrange them ſo as to produce pleaſure and profit.

But it is not ſufficient that the fable be correſpondent with the ſubject, and have the properties above deſcribed; for it muſt alſo be conſiſtent with itſelf. The poet may invent what ſtory he pleaſes, and form any imaginary beings that his fancy ſhall ſuggeſt; but here, as in dramatic writings, when perſons are once introduced, they muſt be ſupported to the end, and all ſpeak and act in character; for notwithſtanding the general licence here allowed, ſome order muſt be obſerved, and, however wild and extravagant the characters, they ſhould not be abſurd. Add to this, that the whole muſt be clear and intelligible; for the "fable, as Mr. Hughes obſerves, being deſigned only to cloath and adorn the moral, but not to hide it, ſhould reſemble the draperies we admire in ſome of the ancient ſtatues, in which the folds are not too many nor too thick, but ſo judiciouſly ordered, that the ſhape and beauty of the limbs may be ſeen through them."

ALLEGORIST, one who writes in, or has recourſe to, allegories.

ALLEGORY, a figurative diſcourſe, in which ſomething elſe is intended than what is contained in the words literally taken.

The word is Greek, *αλληγορια*, and compounded of *αλλος*, otherwiſe, and *αγορευω*, to relate.

ALLEGRO, in muſic, an Italian word, ſignifying that the part is to be played in a briſk, gay, and ſprightly manner.

ALLERION, in heraldry, a ſort of eagle, without beak or feet, having nothing perfect but the wings.

ALLEVEURE, a ſmall braſs Swediſh coin, worth about 2 ½ *d.* Engliſh.

ALLEY, in gardening, a ſtrait parallel walk, bounded on both ſides with trees, ſhrubs, &c. and uſually covered with gravel or turf.

It is diſtinguiſhed from a path, by being broad enough for two to walk a-breaſt.

Covered ALLEY, is that over which the branches of the trees on each ſide meeting each other, form a ſhade.

ALLEY *in zigzag*, is that formed by ſeveral angles, in order to render it more ſolitary and obſcure.

ALLEY *of compartment*, that which divides the ſquare of a parterre.

ALLIANCE, in the civil and canon law, implies the relation between two perſons, or two families, contracted by marriage.

Alliance is alſo uſed to ſignify a treaty entered into by ſovereign princes or ſtates, for their mutual ſafety or defence.

Defenſive **Alliance** is that whereby the contracting parties engage to ſtand by and aſſiſt each other againſt any power that ſhall attack either.

Offenſive **Alliance** implies an agreement between powers, whereby they engage themſelves to attack jointly ſome other prince or ſtate.

ALLIARIA, *Jack by the Hedge*, or *Sauce all alone*, in botany, the name of a plant, with a ſlender, white, ligneous root, with a garlick ſmell, from whence proceed ſtalks to the height of about two feet, round, ſlender, hairy, ſtriated, and ſolid. The leaves at firſt are round, like thoſe of ground-ivy, but much bigger, and afterwards acquire a ſort of a point; are crenated on the edges; ſmooth, and of a pale green colour, with ſomewhat of the ſmell and taſte of garlick. They are placed in no regular order; and at the top are many flowers, conſiſting of four white petals, from whoſe flower-cup ariſes a piſtil that turns to a fruit, or membranaceous round pod, with a partition in the middle, to which two imbricated valves adhere on each ſide, divided into two cells, full of oblong, roundiſh, black ſeeds.

It is common in hedges and ſhady waſte places, and flowers in May and June. It is good in cold ſcurvies, and in conſtitutions that abound with acids. Outwardly, the juice is good in putrid and ſordid ulcers. If the herb has been dried for a day in the ſhade, and then bruiſed in a mortar, and the juice expreſſed, it will keep in bottles for ſeveral years, with oil at the top. *Brookes's Natural Hiſtory.*

ALLIGATION, in arithmetic, is the method of reſolving queſtions relating to the mixture of commodities, and their value and effects, when united in a compoſition.

The word is formed of the Latin, *alligare*, to tie together; perhaps from a ſort of vincula, or circular ligatures, ordinarily uſed to connect the ſeveral numbers together.

Alligation is of two kinds, *medial* and *alternate.*

Alligation *Medial* is when, from the ſeveral quantities and rates of divers ſimples given, we diſcover the mean rate of a mixture compounded out of them.

To anſwer queſtions of this ſort, the ſum of all the quantities propoſed to be mixed, and alſo the ſum of their particular rates, muſt be found. Then the proportion will be,

As the ſum of all the quantities is to the ſum of all their rates, ſo is any part of the mixture to the mean rate or price of that part.

Examp. A goldſmith has three ſorts of gold, of the reſpective values of 3*l.* 18*s*; 3*l.* 12*s*; and 3*l.* 6*s.* per ounce; if 7 ounces of the firſt ſort, 9 ounces of the ſecond, and 12 of the third, be mixed together, it is propoſed to find the value of a ſingle ounce of this compoſition.

The queſtion prepared as above directed will ſtand,

$$\begin{array}{l} \\ \text{Thus}\left\{\begin{array}{rlll} & & \text{£.} & s. \\ 7 & \text{oz. at} & 3 & 18 \text{ per ounce} \\ 9 & \text{oz. at} & 3 & 12 \\ 12 & \text{oz. at} & 3 & \end{array}\right. \end{array} \begin{array}{r} s. \\ \text{— — —}\ 546 \\ \text{— — — — —}\ 648 \\ \text{— — — — — —}\ \underline{792} \end{array}$$

28 = their ſum. And their total value = 1986

Then 28 oz. : 1986*s.* :: 1 oz. : 70*s.* $\frac{13}{14}$ = 3*l.* 10*s.* 11*d.* $\frac{1}{7}$, the anſwer required.

Alligation *Alternate* is when the rates or qualities of divers ſimples are given, and the quantity of each is required, neceſſary to make a mixture of the given rate or quality.

Alligation *Alternate* ſhews the due proportion of ſeveral ingredients, and counterchanges the places of ſuch exceſſes or differences as ariſe between the mean price and the extremes, aſcribing that to the greater extreme, which proceeds from the leſſer, and contrarily.

To reſolve queſtions relating to alligation alternate, the rule is to ſet down all the particular rates, with their mean rate; then take the ſeveral differences between the mean rate and the particular rates, ſetting down thoſe differences alternately; this done, add all the differences into one ſum: then the proportion will be,

As the ſum of all the differences is to the ſum of all the quantities given; ſo is every particular difference to its particular quantity required.

Examp. A grocer would make a mixture of 144 pounds of ſugar, which ſhould be worth 12 pence per pound, and that mixture to conſiſt of four ſorts of ſugar at the reſpective prices of 6, 10, 15, and 17 pence per pound: it is required to find how much of each ſort of ſugar is neceſſary to that compoſition?

$$\text{Mean price } 12\left\{\begin{array}{r} 6 \\ 15 \\ 10 \\ 17 \end{array}\right\}\begin{array}{r} 3 \\ 6 \\ 5 \\ \underline{2} \end{array}$$

16 the ſum of the differences.

$$\text{Then}\left\{\begin{array}{l} 16 : 144 :: 3 : 27 \text{ the pounds of } 6\,d. \\ 16 : 144 :: 6 : 54 \text{ the pounds of } 15\,d. \\ 16 : 144 :: 5 : 45 \text{ the pounds of } 10\,d. \\ 16 : 144 :: 2 : 18 \text{ the pounds of } 17\,d. \end{array}\right\}\text{per pound.}$$

Note, the work of theſe proportions may be greatly ſhortened, by dividing the ſecond number by the firſt, and multiplying that quotient by the reſpective third numbers; for theſe products will anſwer the queſtion.

In order to give a general demonſtration of the above rule for reſolving queſtions relating to alligation alternate, let m repreſent the mean rate of the intended compoſition, $m-a$, $m+b$, $m-c$, $m+d$, &c. the ſeveral rates of the component parts, S the ſum total of the compound. Now, by writing down the ſeveral rates together with their mean rate, as in the foregoing example, and taking the alternate differences, we ſhall have,

$$m\left\{\begin{array}{l} m-a \\ m+b \\ m-c \\ m+d \\ \&c. \&c. \end{array}\right\}\begin{array}{l} b \\ a \\ d \\ c \\ \&c. \end{array}$$

Put $b+a+d+c$, &c. $=s$, then according to the above rule, it will be

$$\left.\begin{array}{l} s : S :: b : \frac{b\times S}{s} \\ s : S :: a : \frac{a\times S}{s} \\ s : S :: d : \frac{d\times S}{s} \\ s : S :: c : \frac{c\times S}{s} \\ \&c.\ \&c. \end{array}\right\}\begin{array}{c}\text{the required quantity of that part} \\ \text{whoſe mean rate is}\end{array}\left\{\begin{array}{l} m-a \\ m+b \\ m-c \\ m+d \\ \&c. \end{array}\right.$$

Now it is very evident that the ſum of theſe quantities, viz. $\frac{b\times S}{s}+\frac{a\times S}{s}+\frac{d\times S}{s}+\frac{c\times S}{s}$, &c. is equal to S; for, as they have one common denominator, viz. s, which is equal to $b+a+d+c$, &c. and the ſum of the numerators equal to $\overline{b+a+d+c,\ \&c.}\times S$, it follows that the ſum of the ſaid quantities will be expreſſed by $\frac{s\times S}{s}$ or S. It only now remains to ſhew that the ſum of the products ariſing by multiplying theſe quantities into their correſponding rates, will be equal to the ſum total of the compound multiplied into the mean rate. Let the rate $m-a$ be multiplied by its correſponding quantity $\frac{b\times S}{s}$, the product is $\frac{bm-ab}{s}\times S$: in the ſame manner by multiplying the remaining quantities by their adjacent rates, and taking the total of all the products, we ſhall have $\frac{bm-ab}{s}\times S+\frac{am+ab}{s}\times S+\frac{dm-dc}{s}\times S+\frac{cm+cd}{s}\times S$, &c. which being properly contracted, becomes $\frac{bm+am+dm+cm}{s}$ &c. $\times S$, or by reſtoring the value of s, $\frac{b+a+d+c,\ \&c.}{b+a+d+c,\ \&c.}\times m\,S$, that is $m\,S$. Q. E. D.

Corol. The quantities $\frac{b\times S}{s}$, $\frac{a\times S}{s}$, $\frac{d\times S}{s}$, are in a direct ratio of the alternate differences.

Hence we get the following rule for the ſolution of queſtions appertaining to *alligation partial*, ſo called when the particular rates of all the ingredients propoſed to be mixed, the mean rate of the whole mixture, and any one of the quantities to be mixed are given, to find how much of each of the other ingredients is requiſite to compoſe the mixture.

The rule: Set down all the particular rates, with their mean rate, and find their differences, as in *Alligation alternate*, without having any regard to the quantity given.—Then the proportion will be,

As the quantity found by the differences of the ſame name with the quantity given, is to the given quantity; ſo is any of the other quantities found by the differences, to the quantity of its name.

ALLIGATOR, in natural hiſtory, an amphibious creature common in South-America, ſuppoſed by ſome authors to be the ſame with the crocodile found in Aſia and Africa. Its head is long, and ſlender towards the extremity, gradually forming a ſnout like that of a hog. Both the upper and lower jaws have a row of very ſtrong and pointed teeth.

Theſe creatures abound in the river of Guiaquil in South-America, and when tired of fiſhing leave the water to baſk in the ſun, where they appear more like logs of half rotten wood thrown aſhore by the current, than living creatures; but upon perceiving any veſſels near them, they immediately plunge into the water. Some of them are of ſo monſtrous a ſize, as to exceed five yards in length. During the time they lie baſking on the ſhore, they keep their huge mouths wide open, till filled with muſchetos, flies, and other inſects, when they ſuddenly ſhut their jaws, and ſwallow their prey. Its whole body is covered with ſcales impenetrable to a muſket-ball, unleſs it happens to hit them in the belly near the fore-legs, the only part vulnerable.

The alligator is an oviparous creature. The female makes a large hole in the ſand near the brink of a river, and there depoſits her eggs, which are nearly equal to thoſe of an oſtrich, and as white as thoſe of a hen, but much more ſolid. She generally lays about an hundred, continuing in the ſame place till they are all depoſited, which is about a day or two. She then covers them with the ſand, and the better to conceal them, rolls herſelf not only over her precious depoſitum, but to a conſiderable diſtance. After this precaution ſhe returns to the water, till natural inſtinct inform her, that it is time to deliver her young from their confinement; when ſhe comes to the ſpot, followed by the male, and tearing up the ſand, begins breaking the eggs, but ſo carefully, that ſcarce a ſingle one is injured; and a whole ſwarm of little alligators are ſeen crawling about. The female then takes them on her neck and back, in order to remove them into the water; but the watchful gallinazos make uſe of this opportunity to deprive her of ſome: and even the male alligator, which, indeed, comes for no other end, devours what he can, till the female has reached the water with the few remaining; for all thoſe which either fall from her back, or do not ſwim, ſhe herſelf eats; ſo that of ſuch a formidable brood happily not more than four or five eſcape.

The gallinazos, a large bird, common in South-America, are their moſt inveterate enemies, or rather extremely fond of their eggs, in finding which they make uſe of uncommon addreſs. Theſe birds often make it their whole buſineſs to watch the females during the ſummer, the ſeaſon when they lay their eggs, the ſands on the ſides of the rivers not being then covered with water. The gallinazo perches in ſome tree, where it conceals itſelf among the branches, and there ſilently watching the female alligator till ſhe has laid all her eggs, retires pleaſed that ſhe has concealed them beyond diſcovery. But ſhe is no ſooner under the water than the gallinazo darts down on the repoſitory, and with its beak, claws, and wings, tears up the ſand, and devours the eggs, leaving only the ſhells. This banquet would, indeed, richly reward its long patience, did not a multitude of gallinazos, from all parts, join the fortunate diſcoverer, and ſhare in the ſpoil.

Theſe alligators are the greateſt deſtroyers of the fiſh, it being their moſt ſafe and general food; nor are they wanting in addreſs to ſatiſfy their deſires: eight or ten as it were by compact, draw up at the mouth of a river or creek, whilſt others of the ſame corps go a conſiderable diſtance up the river, and chaſe the fiſh downwards, by which means none of any bigneſs eſcape them. The alligators, being unable to eat under water, on ſeizing a fiſh, raiſe their heads above the ſurface, and by degrees draw the fiſh from their jaws, and chew it for deglutition. After ſatisfying their appetite, they retire to reſt on the banks of the river.

When they cannot find fiſh to appeaſe their hunger, they betake themſelves to the meadows bordering on the banks of the river, and devour calves and colts; and in order to be more ſecure in ſeizing their prey, take the opportunity of the night, that they may ſurpriſe them in their ſleep; and it is obſerved, that thoſe alligators which have once taſted fleſh, become ſo fond of it, as never to take up with fiſh but in caſes of neceſſity. There are even too many melancholy inſtances of their devouring the human ſpecies, eſpecially children, who, from the inattention natural to their age, have been without doors after it is dark; and though at no great diſtance, theſe voracious animals have dared to attack them, and having once ſeized the child with their mouth, to make ſure of their prey againſt that aſſiſtance which the cries of the victim never fail to bring, haſten into the water, where they immediately drown it, and then return to the ſurface and devour it at leiſure.

The inhabitants of thoſe places where they abound are very induſtrious in catching and deſtroying them. Their uſual method is by a caſonate, or piece of hard wood ſharpened at both ends, and baited with the lungs of ſome animal. This caſonate they faſten to a thong, the end of which is ſecured on the ſhore. The alligator, on ſeeing the lungs floating on the water, ſnaps at the bait, and thus both points of wood enter his jaws in ſuch a manner, that he can neither ſhut nor open his mouth. He is then dragged aſhore, where he violently endeavours to reſcue himſelf, while the Indians bait him like a bull, knowing that the greateſt damage he can do is to throw down ſuch as for want of care or agility do not keep out of his reach.

ALLIUM, garlick, in botany, the name of a plant, with a bulbous root, conſiſting of ſeveral membranes, of a whitiſh colour, mixed with a purpliſh caſt. The leaves are oblong, not fiſtulous as in onions, but like graſs, and the flowers conſiſt of ſix whitiſh leaves, with a piſtil in the middle, which turns into a roundiſh fruit of the ſize of a pea, and of a purpliſh colour without, but the pulp within is whitiſh. It is divided into three cells, full of roundiſh and blackiſh ſeeds. Garlick is proper to warm and ſtimulate the ſolids, and to diſſolve the groſs clammy fluids, whence it is good in cold conſtitutions, and in moiſt aſthmas, as well as all defluxions on the breaſt. It has been found very ſerviceable in the dropſy, for it will ſometimes cure it without any other medicine. It may be given alone, or in a decoction, made into a ſyrup; but it muſt be avoided in all inflammatory diſpoſitions and hot diſeaſes. It may be eaſily propagated in gardens, by planting the cloves, or ſmall bulbs, in Auguſt or September, about four or five inches from each other. In the middle of June the leaves ſhould be tied in knots, to prevent their running to ſeed, and then the bulb will be greatly enlarged. Towards the end of July the leaves will begin to wither, and then the root ſhould be taken out of the ground, and hanged up in a dry room. *Brookes*'s *Natural Hiſtory.*

ALLOCATION, an allowance made upon account in the Exchequer.

Allocatione *Facienda*, a writ for allowing to an accountant ſuch ſums of money as he has lawfully expended in his office; directed to the lord-treaſurer, and barons of the Exchequer.

ALLOCATO *Comitatu*, a new writ of exigent allowed, before any other county-court held, on the former not being fully ſerved or complied with.

ALLODIAL, an epithet applied to an inheritance held without paying any acknowledgment to either lord or ſuperior.

The word is formed from the Saxon *a* privative, and *leof*, lord; *q. d.* held without a ſuperior.

Allodial lands are what we term free lands, which a perſon enjoys without paying any fine, rent, or ſervice.

ALLODIUM, free lands, or ſuch as are the abſolute property of their owner, without his being obliged to pay any acknowledgment whatſoever.

ALLOM. See the article Alum.

ALLOY, or **Allay**, a proportion of a baſer metal with one that is finer.

All gold coin has an alloy of ſilver, and ſilver coin an alloy of copper. A pound weight of ſtandard gold, by the preſent ſtandard of the mint, is two and twenty carats fine, and two carats alloy; and a pound weight of ſtandard ſilver conſiſts of eleven ounces two penny weights of fine ſilver, and eighteen penny-weights of alloy. And in proportion as gold or ſilver has more or leſs alloy than that abovementioned, it is ſaid to be coarſer or finer than the ſtandard.

ALLUMINOR, a perſon who colours or paints upon paper or parchment.

The word is derived from the French *allumer*, to lighten.

ALLUSION, in rhetoric, a figure by which ſomething is applied to, or underſtood of another, on account of ſome ſimilitude between them.

ALLUVION, among civilians, denotes the gradual increaſe of land along the ſea-ſhore, or on the banks of rivers.

ALMACANTERS, in aſtronomy, are leſſer circles of the ſphere parallel to the horizon, imagined to paſs through all the points of the meridian.

The word is formed of the Arabic *almocanthatat*.

The almacanters are the ſame thing with regard to the azimuths and horizon, that the parallels of latitude are with regard to the equator. See **Azimuth**.

The almacanters ſerve to ſhew the height of the ſun and ſtars; and are deſcribed on ſome quadrants, &c. being alſo called parallels of altitude. See **Parallel** *of Altitude*.

Almacantars-*Staff*, an inſtrument uſually made of pear-tree or box, having an arch of fifteen degrees, uſed to take obſervations of the ſun, about the time of its riſing and ſetting, in order to find the amplitude, and conſequently the variation of the compaſs.

ALMAGEST, the name of a book compoſed by Ptolemy, containing a variety of geometrical problems, and a great number of aſtronomical obſervations made by the ancients.

The original title of this work was *συνταξις μαγιςη*, the great conſtruction or collection; but the Arabians, who tranſlated it into their language, prefixed to the laſt word *magiſte*, the Arabic particle *al*, calling it *almagiſte*; whence the preſent name.

There are alſo other collections called by the ſame name. Thus Riccioli publiſhed a ſyſtem of aſtronomy, which he called the *New Almageſt*; and Plunkenet, a book which he ſtiled *Almageſtum Botanicum*.

ALMANAC, a table containing a calendar of days and months, the riſing and ſetting of the ſun, the age of the moon, the eclipſes of both luminaries, &c.

Authors are divided with regard to the etymology of the word, ſome deriving it from the Arabic particle *al*, and *manah*, to count; ſome from *almanah*, new-year's gifts; becauſe the Arabian aſtrologers uſed, at the beginning of the year, to make preſents of their ephemerides; and others from the Teutonic *almaen-achte*, obſervations on all the months. Mr. Johnſon derives it from the Arabic particle *al*, and the Greek *μην*, a month.

Hereſy of ALMARIC, a tenet broached in France by one Almaric, in the year 1209. It conſiſted in affirming, that every Chriſtian was actually a member of Chriſt; and that without this faith no one could be ſaved.

His followers went farther, and affirmed, that the power of the Father laſted only during the continuance of the Moſaic law; that the coming of Chriſt introduced a new law; that at the end of this began the reign of the Holy Ghoſt; and that now confeſſion and the ſacraments were at an end, and that every one is to be ſaved by the internal operations of the Holy Spirit alone, without any external act of religion.

ALMENE, in commerce, a weight of two pounds, uſed in weighing ſaffron in ſeveral parts of the continent of the Eaſt-Indies.

ALMOND-TREE, *Amygdalus*, in botany, the name of a diſtinct genus of trees, with roſaceous flowers, and an oblong ſtony fruit, in which is incloſed a kernel of the ſame ſhape.

Almond-trees have a beautiful effect in a garden, while they continue in bloom, and are accordingly cultivated in this country more for the ſake of their flowers than their fruit: though the latter are alſo well worth attending to, and may, with proper care, in a well-ſheltered warm ſituation, be produced very good in England.

Theſe trees are propagated by inoculating a bud of them with a plum or a peach ſtock, or into a ſtock of their own kind, in the month of July. The next ſpring when the buds ſhoot is the time to train them up, either for ſtandards or half-ſtandards, as the cultivator chuſes: though the uſual method is to bud them at the height intended for their ſtems. In the ſecond year after budding, they will be fit to tranſplant into the places they are to remain. The beſt ſeaſon for doing this is in October, as ſoon as their leaves begin to decay, if they are to ſtand in dry ground; but if they are to be removed into a wet ſoil, February is a far more preferable time. It is likewiſe to be obſerved, that plum-ſtocks will always prove the beſt for the latter, and almond, or peach-ſtocks, for the former ſituation.

The bloſſoms of theſe trees often appear in February, when the ſpring is forward: but if froſt comes on while they are out, their beauty is of ſhort duration, for they are ſoon deſtroyed, and produce very little fruit. On the other hand, if theſe trees do not flower till late in March, they ſeldom fail of bearing plenty of almonds, many of which will be very ſweet, and fit for the table when green; but they will not keep long.

Almonds, the fruit of the almond-tree.

There are two kinds of almonds, ſweet and bitter. The greateſt quantity of both ſorts are produced in Syria, Barbary, Turkey, Spain, Italy, the iſland Cyprus, and France. The German ſhops are ſupplied chiefly from Provence and Valencia. In England, three ſorts of almonds are diſtinguiſhed, ſmall Barbary almonds, long Jordan almonds, and ſhort, broad, Spaniſh or Valencia almonds.

Sweet almonds conſiſt chiefly of expreſſible oil, and a fine farinaceous earth; the oil is ſo plentiful, and ſo looſely intermixed with the other principles, that a part of it may be ſqueezed out with the fingers. The medical uſes of ſweet almonds are, to ſoften and obtund acrimony, and to render reſinous ſubſtances ſoluble in water, and in the animal fluids. The reſins of jalap, ſcammony, and others, triturated with almonds, diſſolve in water into an emulſion, and in this form operate effectually, without producing the violent gripes and other dangerous conſequences, which they never fail to do when given by themſelves.

Bitter almonds yield alſo an oil to the preſs, not bitter like the almonds themſelves, but as taſteleſs as that of the ſweet kind, all the bitter matter remaining in the cake left after the expreſſion. Several experiments have been made for determining in what principle the bitterneſs reſides; but they have not anſwered ſo perfectly as could be wiſhed. The almond-cake was diſtilled both with pure water, and with water and ſalt, and with highly rectified ſpirit of wine. The diſtilled waters were ſcarcely bitter, but ſmelt a little of the almond, and had a conſiderable pungency; the diſtilled ſpirit diſcovered ſcarcely any pungency or bitterneſs, and differed very little, in ſmell or taſte, from the pure ſpirit employed: the greateſt part of the bitterneſs, in all diſtillations, was left behind, and continued in the inſpiſſated extracts.

Bitter almonds are poiſonous to animals, particularly to birds. In the human body, they act as reſolvents and aperients. Sweetened with ſugar, or made into an emulſion, they are conſidered as diuretic, and an anthelmintic; but ſeem to be too dangerous a medicine to be given with ſafety, there being inſtances of cordial ſpirits flavoured with bitter almonds proving poiſonous to the human ſpecies.

Almond *Furnace*, a ſmall furnace, in which the refiners of ſilver from lead melt the ſlags of the litharge left after this operation, and by the help of charcoal reduce them again into lead.

Almonds, in anatomy, a name ſometimes given to two glands, generally called the tonſils. See **Tonsils**.

Almonds, among lapidaries, ſignify pieces of rock-cryſtal, uſed in adorning branch-candleſticks, &c. on account of the reſemblance they bear to the fruit of that name.

ALMONER, an officer appointed to diſtribute alms to the poor.

Lord Almoner, or *Lord-high* Almoner *of England*, is an eccleſiaſtical officer, generally a biſhop, who has the forfeiture of all deodands, and the goods of felos de ſe, which he is to diſtribute among the poor.

He has alſo, by virtue of an ancient cuſtom, the power of giving the firſt diſh from the king's table to whatever poor perſon he pleaſes, or, inſtead of it, an alms in money.

ALMUCANTARS. See Almacantars.

ALNAGE, or Aulnage, the meaſuring of woollen manufactures with an ell.

It was at firſt intended as a proof of the goodneſs of the commodity, and accordingly a ſeal was invented as a mark that the commodity was made according to the ſtatute; but it being now poſſible to purchaſe theſe ſeals, they are affixed, whenever the vender pleaſes, to all cloths indiſcriminately, to the great prejudice of our woollen manufactures.

ALNAGER, a public officer, whoſe duty it is to examine into the aſſize of all woollen cloth, fix ſeals upon the various pieces, and collect the alnage-duty for the king.

ALNUS, in botany, the alder-tree. See Alder-Tree.

ALOOF, in navigation, keep aloof, (commonly called keep the luff) is the command given by the pilot or officer to the helmſman, to direct the ſhip's courſe nearer the wind, or nearer that point of the compaſs which the wind blows from. This phraſe probably regards the dangers of a lee-ſhore, from which the pilot might order the helmſman to "keep aloof."

ALOE, in botany, a genus of plants, with a liliaceous flower, conſiſting of one tubular leaf, divided into ſix deep ſegments at the edge. In ſome ſpecies of this genus, the cup, and in others the piſtil, finally becomes a fruit, or ſeed-veſſel, of an oblong cylindric form divided into three cells, containing flat ſemicircular ſeeds.

The ſoil in which theſe plants thrive beſt is on half freſh light earth from a common (and if the turf is taken with it, and rotted, it is much better), the reſt ſhould be white ſea-ſand, and ſifted lime-rubbiſh, of each of theſe two a fourth part; mix theſe together ſix or eight months at leaſt before it is uſed, obſerving to turn it over often in this time.

The firſt ſpecies of aloes is very hardy, in reſpect to cold; and has, in mild winters, endured abroad, being planted in a very dry ſoil, and under a ſouth wall; but as they are liable to be killed in hard froſts, they generally are kept in pots or tubs in a common green-houſe, with oranges, myrtles, &c. but muſt have very little moiſture in winter. Moſt of the other ſorts are better preſerved in an airy glaſs-caſe, in which there is a ſtove to make a little fire in very bad weather, to dry and warm the air in foggy, cold, or wet weather, and to prevent the froſt from entering the houſe.

The fifth, ſixth, ſeventh, eighteenth, thirty-fourth, and thirty-fifth ſorts, require a greater ſhare of heat to preſerve them in winter, and ſhould be ſet in a good ſtove, and kept nearly to the degree of heat marked (upon Mr. Fowler's Botanical Thermometers) temperate. Indeed, moſt of the other ſorts may be kept in the ſame temperature of heat in winter; but then you muſt obſerve, that the greater the heat is in winter, in which you keep them, the more water they will require: and, if they are well managed in this heat, they will grow very much in winter; therefore, great care muſt be taken in the ſevere cold, that it doth not enter the houſe, nor that the heat be at that time leſſened; as alſo how you begin to give them air in the ſpring; for the extreme parts of the plants will be rendered very tender, by their growing freely in winter; and the leaſt check to their growth, at that ſeaſon, is very often their deſtruction.

Moſt of the African ſorts of aloes produce flowers with us annually, when grown to a ſufficient ſize, which is generally the ſecond, and ſeldom more than the third year, after planting from off-ſets; but the American aloes (which, for the moſt part, produce their flower-ſtems immediately from the center of the plant) ſeldom flower till they are of a conſiderable age, and this but once during the life of the plant; for when the flower-ſtem begins to ſhoot from the middle of the plant (which, for the moſt part, is of a large ſize, and grows to a great height), it draws all the moiſture and nouriſhment from the leaves; ſo that, as that advances, the leaves decay; and when the flowers are fully blown, ſcarce any of the leaves remain alive; but, whenever this happens, the old root ſends forth a numerous quantity of off-ſets for increaſe; and it is not till this time, that ſome of theſe ſorts can be increaſed, eſpecially the ſecond, third, fourth, fifth, ſixth, and ſeventh ſorts, which never produce any young plants until they flower; at which time the flower-ſtem of the ſeventh ſort is beſet with ſmall heads from bottom to top, which, being taken off, and planted, will grow as well as ſuckers from the roots.

This aloe, which with us ſeldom makes a very large plant, hath yet produced flower-ſtems of a conſiderable ſize, and fifteen feet in height. The flowers are little leſs than thoſe of the large ſort. I cannot here forbear taking notice of a vulgar error relating to the large American aloe; which is, that it never flowers till it is an hundred years old: but this is a miſtake; ſince we have had ſeveral of them flower in England, ſome of which were known not to exceed fifty years old, and others, which flowered many years ago, cannot be ſuppoſed to have been in England ſo long as to arrive at that age, ſince they were thought too tender for our climate at that time, when green-houſes were not known; as may be ſeen by looking into Gerrard's and Parkinſon's Herbals.

Thoſe who are deſirous of having this ſort of aloe flower, may, by giving the plants large tubs for their roots to ſpread, greatly promote their growth; and, in proportion to the growing of the plants, their flowering is haſtened: for the bud being formed in the center of the plants, when the number of leaves which enfold it are thrown off, the ſtem will advance; ſo that, in Spain and Portugal, where the plants grow faſt, they produce flowers in eighteen or twenty years; and in the Weſt-Indies, where they grow faſter, in ſeven or eight.

The African aloes, for the moſt part, afford plenty of ſuckers, by which they are increaſed; but thoſe few that do not may be moſt of them propagated, by taking off ſome of the under leaves, laying them to dry for a week or ten days, as was directed for the off-ſets; then plant them in the ſame ſoil as was directed for them, putting that part of the leaf which did adhere to the old plant about an inch, or an inch and an half (according to the ſize of the leaf) into the earth, giving them a little water to ſettle the earth about them: then plunge the pots into a moderate hot-bed, obſerving to ſcreen them from the violence of the ſun, and give them gentle refreſhings with water. The beſt ſeaſon for this is in June, that they may puſh out heads before winter. *Miller's Dict.*

Aloes, in the materia medica, a bitter, gummy, reſinous, inſpiſſated juice; prepared from the leaves of the above ſpecies of plants. There are three different ſorts of aloes found in the ſhops, diſtinguiſhed by the names of *ſocotorine*, *hepatic*, and *caballine*.

Aloe *Socotorina.* Socotorine aloes are brought from the iſland Socotora, in the Indian ocean, wrapt in ſkins; and obtained from the *aloe ſoccotorina anguſtifolia ſpinoſa flore purpureo.* This ſort of aloes is of a bright ſurface, and in ſome degree pellucid, in the lump; of a yellowiſh red colour, with a purpliſh caſt: when reduced into powder, of a golden colour. It is hard and friable in the winter; ſomewhat pliable in the ſummer, and ſoftens betwixt the fingers. Its bitter taſte is accompanied with an aromatic flavour, but not ſufficient to prevent its being diſagreeable: the ſmell is not very unpleaſant, and ſomewhat reſembles that of myrrh.

Aloe *Hepatica.* Hepatic, Barbadoes, or common aloes, are uſually brought from Barbadoes; the beſt ſort in large gourd ſhells; an inferior kind in pots; and a ſtill worſe in caſks; and extracted from the *aloe dioſcoridis et aliorum*, of Sloan. This is darker coloured than the foregoing, and not ſo clear or bright. It is generally drier and more compact; though ſometimes, eſpecially the caſk ſort, quite ſoft and clammy. Its ſmell is much ſtronger and more diſagreeable; the taſte intenſely bitter and nauſeous, with little or nothing of the aromatic flavour of the ſocotorine.

Aloe *Caballina*. Caballine, or horſe aloes, are prepared, probably, from the *aloe guineenſis caballina vulgari ſimilis ſed tota maculata*, and not, as is generally ſuppoſed, from the feces of the hepatic; the difference not being in purity, but in quality. It is eaſily diſtinguiſhed from both the foregoing by its ſtrong rank ſmell: in other reſpects it agrees pretty much with the hepatic; and is, not unfrequently, ſold in its place. Sometimes it is prepared ſo pure and bright as ſcarce to be diſtinguiſhable by the eye, even from the ſocotorine; but its offenſive ſmell readily betrays it: and if this alſo ſhould be diſſipated by art, its wanting the aromatic flavour of the finer aloes will be a ſufficient criterion.

Aloes is a ſtimulating cathartic bitter: taken in ſufficient doſes to purge effectually, as two ſcruples or a dram, it occaſions commonly a great irritation about the anus, and ſometimes a diſcharge of blood. In ſmaller doſes, as ten or twelve grains, repeated once or twice a day, it not only evacuates the firſt paſſages, but attenuates and diſſolves viſcid humours in the remoter parts; warms the habit, quickens the circulation, and promotes the menſtrual and hæmorrhoidal fluxes: its continued uſe renders the blood ſenſibly more fluid, as appears on veneſection. For a time, in theſe ſmall doſes, it does not act by ſtool; but at length it produces a gentle looſeneſs, of longer continuance than that occaſioned by moſt other purgatives: hence its utility in habitual coſtiveneſs. This ſtimulating cathartic is particularly adapted to perſons of a phlegmatic temperament and ſedentary life, to cachectic indiſpoſitions, and oppreſſions of the ſtomach by viſcid crudities contracted from irregularity: in dry bilious habits it is often injurious, immoderately heating the blood, or inflaming the bowels.

This bitter juice is accounted deſtructive to worms, (or to the matter which favours their production) whether taken internally, or applied in plaiſters to the umbilical region. It is powerfully antiſeptic; and commonly made an ingredient in tinctures and balſams for cleanſing and healing wounds or putrid ſores.

Aloes conſiſts of a reſinous matter, and a large proportion of a ſubſtance called gum. By boiling in water, in the proportion for inſtance of four ounces to a quart, it nearly all diſſolves, except the impurities, into a dark-coloured liquor, which, on ſtanding in the cold for a night, depoſites the reſin to the bottom, the gummy part continuing diſſolved. From this ſolution (poured off from the precipitated reſin, and, if any feculencies appear in it, paſſed through a ſtrainer) the gum may be recovered in a ſolid form by evaporation. The coarſer ſorts of aloes may be purified from their feculencies, without any ſeparation of the gummy and reſinous parts, by ſtraining the ſolution whilſt hot, and ſetting it directly to evaporate, without ſuffering it to ſettle.

The hepatic aloes is found to contain more reſin and leſs gum than the ſocotorine; and this than the caballine. Twelve ounces of caballine aloes yielded two of reſin; the ſame quantity of ſocotorine three; of hepatic almoſt four: of gummy extract, the caballine yielded nine ounces; the ſocotorine ſomewhat leſs than nine; the hepatic eight. The watery ſolution of the gummy part of the ſocotorine, after the ſeparation of the reſin, appeared of a bright brown colour, with a caſt of red; that of the caballine, deep reddiſh brown; of the hepatic, browniſh yellow, without any tendency to redneſs.

The reſins of all the ſorts, purified by ſolution in ſpirit of wine, (for in their ſettling from the watery decoction of the aloes, the impurities of the juice ſubſide along with them) have little ſmell: that obtained from the ſocotorine has ſcarcely any perceptible taſte, that of the hepatic a ſlight bitteriſh reliſh, and that of the caballine a little more of the aloetic flavour. The gummy extracts alſo are leſs diſagreeable than the crude aloes; the extract of the ſocotorine has a very little ſmell, and is in taſte ſcarcely unpleaſant; that of the hepatic is in ſmell ſomewhat ſtronger, but ſeems to taſte rather leſs ungrateful than the extract of the ſocotorine; the gum of the caballine retains a conſiderable ſhare of the peculiar rank ſmell of this kind of aloes, but its taſte is not much more unpleaſant than that of the extracts made from the other two.

The purgative virtue of aloes, contrary to that of moſt of the other cathartic vegetables, reſides chiefly in the gummy part; the reſin, tho' taken in conſiderable doſes, (whether divided by teſtaceous powders, or diſſolved in ſpirit of wine) having little or no cathartic power. Socotorine aloes, which contains more gum than the hepatic, purges more, and with greater irritation: the former therefore is to be preferred where a ſtimulus is required, as for promoting or exciting the menſtrual flux; whilſt the latter is better fitted for a common purge. The vulnerary and balſamic virtues, on the other hand, reſide principally in the reſin; and hence the hepatic, which is more reſinous than the ſocotorine, is found to be more ſerviceable in external applications. The caballine aloes, on account of its offenſive ſmell, is very rarely made uſe of, at leaſt under its own name, either internally or externally.

The purgative aloetic gum diſſolves, not only in watery, but likewiſe in ſpirituous menſtrua; and even more readily in proof ſpirit and in rectified ſpirit, than in water or wine. When powdered aloes is macerated, or digeſted in a gentle warmth, with water, with wine, or with vinous ſpirits largely diluted, the powder ſoftens, and becomes tenacious, and the ſolution goes on exceeding ſlowly: hence, in making tinctures or ſolutions of aloes in theſe kind of menſtrua, it is of advantage to mix with the powder ſome clean dry ſand, which, by keeping it divided, promotes the diſſolution. With rectified and proof ſpirits, the aloes does not cohere, but continues powdery till diſſolved.

Aloes is ſometimes taken by itſelf, ſometimes mixed with ſaponaceous medicines, warmed with aromatics, acuated with pungent materials, combined with the deobſtruent gums, &c. Many of theſe kinds of compoſitions have been received as officinals: a pill, for example, compoſed of equal parts of aloes and ſoap, with a proper quantity of thin honey: a powder, of eight parts of aloes, with two of canella alba, or with one of Virginian ſnake root, and one of ginger: a tincture, made by digeſting five ounces of theſe powders in five or ſix pints of mountain wine: pills of four parts of aloes, two of myrrh, and two or one of ſaffron, made up with ſyrup of ſaffron, or of orange peel: vinous and ſpirituous tinctures of the aloes, with different proportions of the myrrh and ſaffron, &c.

Among different aromatic materials made trial of, cloves ſeemed the beſt adapted for alleviating the offenſiveneſs of the aloes: the committee appointed by the London college for reforming their pharmacopæia, made choice of canella alba, on account of its not rendering the medicine ſo hot as the neceſſary quantity of the clove itſelf would do, and yet having ſo much of the clove flavour, as to cover the aloes in a ſufficient degree: ſome commend the caſia caryophyelata, or clove bark, as having more of the clove flavour than canella alba, and yet not being very hot. Where volatile ſpirits are to be joined, a ſolution of the aloes, in dulcified ſpirit of ſal ammoniac, or in ſpirit of ſal ammoniac made with quicklime, are very elegant preparations, and require little aſſiſtance from aromatics to render them ſupportable to the palate; the offenſiveneſs of the aloes being greatly abated by the ſpirit, and the pungency of the ſpirit ſheathed by the aloes; the ſpirit of ſal ammoniac made fixed with alkaline ſalt, does not diſſolve near ſo much of the aloes as the two abovementioned. *Lewis's Hiſtory of the Materia Medica.*

Aloes *Wood*. See Lignum *Aloes*.

ALOETICS, a general name for all medicines, whoſe baſis or principal ingredient is aloes.

ALOGIANS, in eccleſiaſtical hiſtory, a ſect of ancient heretics, who denied that Jeſus Chriſt is the logos, or eternal word; and therefore they rejected the goſpel of St. John as a ſpurious production.

The word is Greek, and compounded of *α*, priv. and λογος, the word.

ALOPECIA, in medicine, implies a falling off of the hair, occaſioned either by a defect of nouriſhment, or a bad ſtate of the humours.

ALP, a name given to the bullfinch, in ſeveral parts of England. See BULLFINCH.

ALPHA, the name of the firſt letter of the Greek alphabet, anſwering to our A.

As a numeral it ſtands for one, or the firſt of any thing; hence alpha and omega, being the firſt and laſt letters in the Greek alphabet, are uſed to ſignify the eternity of God.

ALPHABET, the natural or cuſtomary ſeries of the ſeveral letters of a language.

The word is formed from *alpha*, and *beta*, the firſt and ſecond letters of the Greek alphabet.

The number of letters is different in the alphabets of different languages. The Engliſh alphabet contains 24 letters, to which if we add *j* and *v* conſonant, the ſum will be 26; the French 23; the Hebrew, Chaldee, Syriac, and Samaritan, 22 each; the Arabic 28; the Perſian 31; the Turkiſh 33; the Georgian 36; the Coptic 32; the Muſcovite 43; the Greek 24; the Latin 22; the Sclavonic 27; the Dutch 26; the Spaniſh 27; the Italian 20; the Ethiopic, and Tartarian, each 202; the Indians of Bengal 21; the Barameſe 19. The Chineſe have, properly ſpeaking, no alphabet, except we call their whole language by that name: their letters are words, or rather hieroglyphics, amounting to about 80,000.

ALPHABET is alſo uſed for a cypher, or table of the uſual letters of the alphabet, with the correſpondent ſecret characters, and other blank ſymbols intended to render the writing more difficult to be decyphered.

ALPHABET, among merchants, a kind of index, with the twenty-four letters in their natural order, in which are ſet down the names of thoſe who have open accounts, referring to the folios of the ledger.

ALPHABETICAL, ſomething belonging to, or placed in the order of, the alphabet.

ALPHETA, in aſtronomy, the name of a fixed ſtar in the northern crown, and generally called lucida coronæ. See the article *Lucida* CORONÆ.

ALPHONSIN, in ſurgery, an inſtrument for extracting bullets out of gun-ſhot wounds.

This inſtrument derives its name from the inventor Alphonſus Ferrier, a phyſician of Naples. It conſiſts of three branches, which are cloſed by a ring. When cloſed and introduced into the wound, the operator draws back the ring towards the handle, upon which the branches opening take hold of the ball; and then the ring is puſhed from the haft, by which means the branches graſp the ball ſo firmly as to extract it from the wound.

ALPHONSINE TABLES, aſtronomical tables calculated by order of Alphonſus king of Caſtile, in the conſtruction of which that prince is ſuppoſed to have contributed his own labour.

ALPHOS, among phyſicians, a diſeaſe of the ſkin, otherwiſe called *vitiligo*, when that membrane is ſprinkled, or as it were covered with white ſpots. Several authors conſider it as a ſymptom of the leproſy. See the article LEPROSY.

The word is Greek, *αλφος*, a radix in that language, and ſignifies white.

ALRAMECH, in aſtronomy, the name of a ſtar of the firſt magnitude, generally called Arcturus. See ARCTURUS.

ALSINASTRUM, in botany, a genus of plants reſembling the alſine, or chickweed.

ALSINE, chickweed, in botany, a ſmall, creeping, juicy herb; annual, yet common in all times of the year in ſhady cultivated ground.

This herb was formerly employed in cataplaſms againſt external inflammations; and its expreſſed juice, a decoction, given alſo internally, as an aperient, antiſcorbutic, antiphlogiſtic, and as a reſtorative (that is, perhaps, for abating hectic fits) in atrophies and conſumptions. Nor do the virtues aſcribed to it appear to be wholly without foundation: experiment diſcovers, that it is not deſtitute of active matter, though this matter is ſo far divided and diluted in the herb, as ſcarcely to manifeſt itſelf till ſeparated from the groſſer parts.

The freſh leaves have an herbaceous ſomewhat ſaline taſte without any remarkable ſmell: in diſtillation, with water or with ſpirit, they give over nothing. On expreſſion, they yield a large quantity of green-coloured turbid juice; with difficulty depoſits its feces upon ſtanding, but immediately parts with them on being heated to ebullition, and, being now paſſed through a ſtrainer, looks clear and reddiſh. The depurated juice, inſpiſſated to the conſiſtence of an extract, diſcovers to the taſte a cool penetrating ſaline pungency, which quickly goes off, leaving a ſlight auſterity in the mouth. *Lewis's Hiſtory of the Materia Medica.*

ALT, in muſic, a term applied to the high notes in the ſcale. See GAMUT.

ALTAR, a place upon which ſacrifices were anciently offered to ſome deity.

As ſacrifices offered up to God are as ancient as the world, altars are of no leſs antiquity. The Scripture in ſome places ſpeaks of altars erected by the patriarchs, without deſcribing the form or matter of them. The altar which Jacob ſet up at Bethel was nothing but a ſtone which had ſerved him for a pillow. Gideon ſacrificed upon nothing better than a ſtone which was before his houſe. The firſt altars which God commanded Moſes to raiſe to him muſt have been of earth, or rough ſtones; and the Lord declared to him, that if any uſe were made of iron in them they would be impure. The altar of burnt-offerings which he cauſed ſome time after to be made, was a kind of trunk of Shittim-wood, hollow, and covered over with plates of braſs.

The altar which Moſes enjoined Joſhua to build upon mount Ebal, was to be of unpoliſhed ſtones; and it is very probable, that thoſe which were built afterwards by Samuel, Saul, and David, were of the ſame ſtructure. The altar which Solomon erected in the temple was of braſs, but filled, as is believed, with rough ſtones. It was twenty cubits long, twenty wide, and ten in height. Laſtly, that which was built at Jeruſalem by Zerubbabel, and other Jews who returned from Babylon, was only of rough ſtones: nor was that which the Maccabees rebuilt any better. Joſephus ſays, that the altar which in his time was in the temple was of rough ſtones, fifteen cubits high, forty long, and as many in width.

ALTAR *of Incenſe*. This was a ſmall table of ſhittim-wood, covered with plates of gold, of one cubit in length, another in width, and two in height. At the four corners of it were four kinds of horns, and all round a little border or crown over it. Every morning and evening, the prieſt in waiting for that week, and appointed by lot for this office, offered incenſe of a particular compoſition upon this altar; and to this end, entered with the ſmoaking cenſer filled with fire from the altar of burnt-offerings in the Holy, where this altar was fixed over-againſt the ſhew-bread table. This was the altar which was hidden by Jeremiah before the captivity. The prieſt, having placed the cenſer on it, retired out of the Holy. See Plate IV. *fig.* 5.

Altar, or table, for the ſhew-bread was a ſmall table of ſhittim-wood, covered with plates of gold, having a little border round it, adorned with ſculpture. It was two cubits long, one cubit wide, and one and a half in height. It was placed in the Holy. Upon this table every ſabbath-day, were put twelve loaves with ſalt and incenſe.

ALTAR *of Burnt-offerings*. This was a kind of coffer of ſhittim-wood, covered with braſs plates. It was five cubits ſquare, and three in height. Moſes placed it to the Eaſt, before the entrance of the tabernacle, in the open air, that ſo the fire, which was to be kept perpetually upon it, and the ſmoak ariſing from the ſacrifices which were burnt there, might not ſpoil the inſide of the tabernacle. At the four corners of the altar there was an appearance as it were of four horns, covered with the ſame metal as the reſt of the altar. Within the depth or hollow of it was a grate of braſs, on which the fire was made; through this fell the aſhes in proportion as they increaſed upon the altar, and were received below within a pan which was placed under it. At the four corners of this grate were four rings, and

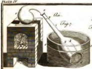


Fig. 1.

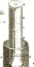


Fig. 2.

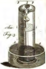
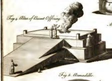


Fig. 3.

Fig. 4. Altar of Burnt Offering.



Altar of Incense Fig. 5.

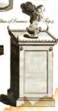


Fig. 6. Armadillo.

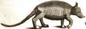
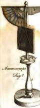


Fig. 7. S. Andrew.



Anemoscope Fig. 8.

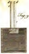


Fig. 9.

Amarante.

Dolce nella Memoria

Fig. 10.

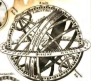

Zenith
Arctic Pole
Solstice Colure
HORIZON
Antarctic Pole
Nadir

Fig. 11. Armillary Sphere.

four chains, which kept it up at the four horns of the altar abovementioned. As this altar was portable, Moſes had rings made and faſtened to the ſides of it, into which were put ſtaves of ſhittim-wood, overlaid with braſs, by the help whereof it was removed from place to place.

Such was the altar of burnt-offerings belonging to the tabernacle erected by Moſes in the wilderneſs: but in Solomon's temple it was much larger. This was a kind of cube, twenty-cubits long, as many wide, and ten in height. It was covered with thick plates of braſs, and filled with rough ſtones; on the eaſt ſide there was an eaſy aſcent leading up to it. When the Jews returned from the captivity of Babylon, they rebuilt the altar of burnt-offerings after the model of Solomon's; but after both the temple and altar had been prophaned by the orders of Antiochus Epiphanes, this altar was demoliſhed, and the ſtones of it were laid up in ſome part of the temple which was unpolluted, till a prophet ſhould be raiſed up by God, who ſhould come and declare the uſe for which they were reſerved. Herod the Great having made a new temple, built an altar of burnt-offerings like that which had been there before; but Joſephus ſays, that the aſcent up to it was on the ſouth-ſide.

The altar of burnt-offerings, according to the rabbins, was a large maſs all built of rough and unpoliſhed ſtones, the baſis whereof was thirty-two cubits, or forty-eight feet ſquare. From thence the altar roſe one cubit, or a foot and a half, then there was a diminiſhing of one cubit in thickneſs; from thence the altar being only thirty cubits ſquare, roſe five cubits, and received a new diminution or in-benching of two cubits, and conſequently was reduced to twenty-eight cubits ſquare. From thence again it roſe three cubits, and grew two cubits ſmaller. Laſtly, it roſe again one cubit, and ſo being in all twenty-four cubits, or thirty-ſix foot ſquare, it formed the hearth on which the ſacrifices were burnt, and the perpetual fire kept up. See plate IV. *fig* 4.

The diminution of two cubits abovementioned, which was about the middle of the altar, ſerved as a paſſage for the prieſts to go and come about the altar, to attend the fire, and place the ſacrifices on it. This altar was compoſed of large plates of maſſy braſs, whence it is called the braſen altar. It is believed, that the altar was all filled with rough ſtones or earth, according to what is ſaid in Exodus; "An altar of earth thou ſhalt make unto me, and ſhalt ſacrifice thereon thy burnt-offerings, and thy peace-offerings—and if thou wilt make me an altar of ſtone, thou ſhalt not build it with hewn ſtone, for if thou lift up thy tool upon it, thou haſt polluted it." At the four corners of the altar, on the laſt diminution or in-benching, were four ſmall pillars of a cubit ſquare, and in the form of a perfect cube. Theſe are the horns of the altar, ſo often mentioned in Scripture; they were hollow, that part of the blood of the ſacrifices might be poured into them.

The aſcent to the altar was by an inſenſible riſe on the ſouth-ſide, and was called kibbeſh; it was thirty-two cubits in length, and ſixteen in breadth, and landed upon the upper benching-in, near the hearth or top of the altar; for to go up to the altar by ſteps was by the law forbidden. The prieſts might go round about the altar, and perform their offices very conveniently upon the two in-benchings which we have deſcribed; namely, that of the middle, which was a cubit, and that above it, which was likewiſe a cubit broad; for it would have been very uneaſy for them to have walked barefoot, on the hearth, which was always heated by the fire that was continually burning there.

With regard to the heathens, they made their altars at firſt only of turf; but afterwards they were made of ſtone, of marble, of wood, and even of horn, as that of Apollo in the iſland of Delos. The figure of them, as well as the materials, was different; ſome were round, others ſquare, others oval: they were always turned towards the eaſt, and ſtood lower than the ſtatues of the gods, which were placed upon baſes above the altar, which was generally adorned with leaves and flowers; thoſe of Apollo with laurel; thoſe of Hercules with poplar; Jupiter's with oak; Venus's with myrtle; and thoſe of Minerva with olive. The altars were uſually conſecrated with oil, which was poured upon them.

A ſecond uſe of altars was to ſerve as a place of refuge, or ſanctuary, to all thoſe who fled to them, whatever crimes they had committed. Romulus was the firſt who appointed theſe places of refuge in the temples, that by this means he might people his new city: and the previleges of theſe ſanctuaries came to ſo great a height, that, at Rome, and in the cities of Greece, the temples were filled with debtors, fugitive ſlaves, and criminals, in defiance of the civil power, which could not force them from the altars.

The height of altars differed, according to the different gods to whom they were conſecrated: for the *Θεοι ουρανιοι*, or Celeſtial Gods, had their altars raiſed to a very great height above the ground; inſomuch that Pauſanias tells us, that the altar of Olympian Jupiter was almoſt twenty-two feet high. To the terreſtrial gods and heroes, they ſacrificed upon altars almoſt cloſe to the ground; and they dug a hole in the earth for thoſe of the infernal gods.

Before temples were in uſe, altars were erected, ſometimes in groves, ſometimes in the highways, and ſometimes on the tops of mountains: and it was cuſtomary to engrave upon them the name, a proper enſign, and character of the deity to whom they were dedicated. Thus St. Paul obſerved on an altar at Athens this inſcription, *Αγνωστω Θεω*, To the unknown God.

ALTAR is alſo uſed to denote the communion-table in the reformed churches.

ALTAR, in aſtronomy. See ARA.

ALTARAGE, the profits ariſing to a prieſt on account of the altar.

ALTERANTS, in medicine. See the article ALTERATIVES.

ALTERATE, in muſic and geometry. See SESQUIALTERATE.

ALTERATIVES, or ALTERATIVE medicines, in the healing art, are ſuch medicines as correct the bad qualities of the animal fluids, without occaſioning any ſenſible evacuation.

ALTERNATE, in a general ſenſe, ſignifies a term applied to ſuch perſons or things, as ſucceed each other by turns.

ALTERNATE, in botany, implies ſuch a diſpoſition of the leaves of a plant, that the firſt on one ſide of a branch ſtands higher than the firſt on the other ſide; the ſecond the ſame, and ſo on to the top.

ALTERNATE, in heraldry, is ſaid with regard to the ſituation of the quarters Thus the firſt and fourth quarters, and the ſecond and third, are uſually of the ſame nature, and are thence called alternate quarters.

ALTERNATE *Angles*, in geometry, are thoſe acute or obtuſe angles which are oppoſite to each other, and formed by a right line cutting two parallel right lines. Thus if AB (plate X. *fig.* 5) be parallel to CD, and the line GH cuts them in I and K, then are the angles AIK, DKI, and BIK, IKC, alternate angles, by 18, Euc. 1. and are always equal.

Alligation ALTERNATE. See ALLIGATION.

ALTERNATE *Ratio*, or *Proportion*, is where the antecedent of the one ratio is to its conſequent, as the antecedent of another to its conſequent; the very ſame ratio, in this caſe, holding alternately in reſpect of the antecedents to each other, and the conſequents to each other.

Thus, if A:B::C:D; then alternately A:C::B:D. See PROPORTION.

ALTERNATION properly ſignifies a ſucceſſion by turns.

ALTERNATIONS, in arithmetic, is a term ſometimes uſed to expreſs the various changes or alterations of order in any number of things propoſed.

This is alſo called permutation, &c. and is eaſily found by a continual multiplication of all the numbers, beginning at unity. Thus, if it be required to know how many changes or alternations can be rung on ſix bells, multiply the numbers 1, 2, 3, 4, 5, 6, continually one into another, and the laſt product gives the number of changes, in this caſe, 720. See the inveſtigation of this rule under the word CHANGE.

ALTERNATIVE, in a general ſenſe, implies nearly the ſame as alternate. See ALTERNATE.

ALTHÆA, *Marſhmallow*, in the materia medica, a ſoft hoary plant, with oblong undivided leaves, and pale fleſh-coloured monopetalous flowers, cut deeply into five ſections, ſet in a double cup, the outermoſt of which is divided into nine parts, the inner into five: the fruit conſiſts of a number of capſules, ſet in form of a flat diſk, containing each a ſingle ſeed: the roots are long and ſlender, with ſeveral fibres of a pale yellowiſh colour on the outſide, and white within. It grows wild in marſhes and other moiſt places, though frequently cultivated in gardens. It is perennial, and flowers from June to near the end of ſummer.

All the parts of althæa abound with a glutinous juice, of ſcarcely any ſmell or particular taſte. The dry roots, boiled in water, give out near half their weight of gummy matter; which, on evaporating the aqueous fluid, forms an unctuous, ſlavourleſs, yellowiſh mucilage. The leaves afford ſcarcely one-fourth their weight, and the flowers and ſeeds ſtill leſs; though the two latter have been looked upon by ſome as the moſt mucilaginous, and accordingly preſcribed in leſs quantity than the other parts of the plant.

Of all the mucilaginous vegetables, marſhmallow-root is, among us, of the moſt general uſe, for obtunding and incraſſating acrimonious thin fluids, in tickling coughs from defluxions on the fauces and lungs, in hoarſeneſs, eroſions of the ſtomach and inteſtines, difficulty and heat of urine, and for lubricating and relaxing the paſſages in nephritic and calculous complaints.

The root is ſometimes given in powder, from a ſcruple to a dram or two, either by itſelf, or in conjunction with other materials of ſimilar intention, as gum tragacanth, ſtarch, &c. It is rather too bulky, however, for this form; and may, in moſt caſes, be taken to better advantage in that of an infuſion or decoction, ſweetened with a little liquorice: an ounce of the dry root is ſufficient for a quart or three pints of water, a larger proportion rendering the liquor diſagreeably ſlimy. A ſyrup, made by boiling a pound of the freſh roots in a gallon of water till half the liquor is waſted, preſſing out the decoction, and after ſettling for a night, boiling it down with four pounds of fine ſugar till the weight of the whole is ſix pounds, is kept in the ſhops, and employed occaſionally in ſome diſorders of the breaſt, and for ſweetening emollient decoctions in nephritic caſes. *Lewis's Hiſtory of the Materia Medica.*

ALTIMETRY, the art of meaſuring altitudes or heights, whether acceſſible or inacceſſible. See ALTITUDE.

The word is compounded of the Latin, *altus*, high, and the Greek, *μετρεω*, to meaſure.

ALTITUDE, *Altitudo*, in geometry, the third dimenſion of body, conſidered with regard to its elevation above the ground; called alſo height or depth.

The word is derived from the Latin, *altus* high.

ALTITUDE *of a Figure*, is the diſtance of its vertex from its baſe, or the length of a perpendicular let fall from the vertex to the baſe. Thus K L (plate IX. *fig.* 3.) being taken for the baſe of the triangle K M L, the perpendicular M P, let fall from the vertex M upon the baſe K L, will be the altitude of the triangle.

Triangles of equal baſes and altitudes are equal, and parallelograms, whoſe baſes and altitudes are equal to thoſe of triangles, are juſt double thereof.

ALTITUDE, in optics, is uſually conſidered as the angle ſubtended between a line drawn from the eye, parallel to the horizon, and a viſual ray emitted from an object to the eye.

If, through the two extremes of an object, S and T (plate IX. *fig.* 7.) two parallels, T V and S Q, be drawn, the angle T V S, intercepted between a ray paſſing through the vertex S, and terminating the ſhadow thereof in V, makes, with the right line T V, what is called, by ſome writers, the altitude of the luminary.

ALTITUDE *of the Eye*, in perſpective, is a right line let fall from the eye perpendicular to the geometrical plane.

ALTITUDE, in aſtronomy, is the diſtance of the ſun or ſtar from the horizon. This altitude is meaſured by an arch of a vertical circle, intercepted between the point where the ſun or ſtar then is, and the horizon.

Apparent ALTITUDE of any heavenly object, is the arch of a vertical circle intercepted between the ſenſible horizon and the center of the object.

True ALTITUDE is the arch of a vertical circle comprehended between the center of the object and the rational horizon.

The true altitudes of the ſun and planets differ but very little from their apparent altitudes; becauſe of their great diſtances from the center of the earth, and the ſmallneſs of the earth's ſemi-diameter, when compared thereto: but the diſtance between the true and apparent altitude of the moon is very conſiderable, it ſometimes amounting to upwards of 50 minutes.

Meridian ALTITUDE *of the Sun*, *Planet*, or *Star*, is an arch of the meridian intercepted between the horizon and the center of the object. For the method of obſerving the meridian altitude of an heavenly object, ſee MERIDIAN *Altitude*, and OBSERVATION.

ALTITUDE *of the Pole* is the height of the pole above the horizon, or an arch of the meridian intercepted between the pole and the horizon.

The altitude of the pole is always equal to the latitude of the place, and the diſtance of the pole from the zenith of the place is always the compliment of the latitude thereof.

ALTITUDE *of the Equinoctial* is the elevation of the equinoctial above the horizon, and is always equal to the complement of the latitude, or the complement of the altitude of the pole.

ALTITUDE *of the nonageſimal Degree* is the altitude of the nonageſimal degree, counted from the point at which it riſes; or it is the complement of the diſtance of the 90th degree of the ecliptic, reckoned from the orient, or eaſt point. See NONAGESIMAL.

ALTITUDE *of Motion*, a term made uſe of by Dr. Wallis, to expreſs the meaſure of any motion computed according to the line of direction of the moving force.

ALTITUDE *of the Earth's Shadow*. See ECLIPSE *of the Moon*.

ALTITUDE *of the Moon's Shadow*. See ECLIPSE *of the Sun*.

Refraction of ALTITUDE is an arch of a vertical circle, as S s (plate IX. *fig.* 5.) whereby the altitude S E, of a ſtar, or other body, is increaſed by means of the refraction.

Parallax of ALTITUDE is the difference C B (plate IX. *fig.* 8.) between the true and apparent place of a ſtar; or the difference B C, between the true diſtance of a ſtar A B, and the obſerved diſtance A C, from the zenith A.

The parallax diminiſhes the altitude of a ſtar, or increaſes its diſtance from the zenith. To find the parallax of altitude, ſee PARALLAX.

Quadrant of ALTITUDE. See the article QUADRANT.

ALTITUDE, in coſmography, is the perpendicular height of an object, or its diſtance from the horizon, upwards.

The altitudes of objects, ſituated on the ſurface of the earth, are either acceſſible or inacceſſible.

Acceſſible ALTITUDE *of an Object* is that whoſe baſe you can have acceſs to, i. e. meaſure the neareſt diſtance between your ſtation and the foot of the object on the ground.

To take an acceſſible ALTITUDE, let C (plate IX. *fig.* 1.) repreſent a tower ſtanding upon level ground, whoſe height is required; with a chain or ſtaff of a known length, meaſure the diſtance between your ſtation at E and D, the foot of the tower, which ſuppoſe equal to 160 feet; then, holding the quadrant in a horizontal poſition, look through the ſights at the tower, and where the viſual ray terminates make a mark, as at A, which will ſhew the height of the eye above D, the bottom of the tower; then elevate the inſtrument till C, the top of the tower is ſeen through the ſights. Now it is plain that the triangle B A C is formed by theſe three lines, viz. B A the diſtance of the obſerver's eye from the tower A C, the height of the tower above his eye, and B C, a line drawn from his eye to the top of the tower. In this triangle the angle A is a right one by the ſuppoſition the angle B is found by the quadrant, which ſuppoſe 70°. and the meaſure of one ſide, B A, is known, viz. 160 feet; whence A C may be eaſily found: for if B A be made radius, then A C will be the tangent of the angle C B A. Therefore, as radius : A B :: tang. ang. A B C : AC=440; and conſequently, if A D, the height of the obſerver's eye from the ground, be added, you will have the whole height of the tower C D.

An acceſſible ALTITUDE may alſo be meaſured geometrically, without the help of the quadrant, in the following manner. Suppoſe it were required to find the height of the tree C D, (plate IX. *fig.* 2.) plant a ſtaff, as E B, of a known length perpendicularly in the ground; then, lying proſtrate on your face, move yourſelf forwards or backwards till the top of the ſtaff E be in a right line with that of the tree at D: meaſure the diſtance from the eye at A to the ſtaff at B, and alſo from A to the foot of the tree at C: then, becauſe the triangles A B E and A C D are ſimilar, it will be, as A B : A C :: B E : C D, the height of the tree required.

Inacceſſible ALTITUDE *of an Object*, is that when the foot or bottom thereof cannot be approached by reaſon of ſome impediment.

To take an inacceſſible ALTITUDE; let A B (plate IX. *fig.* 6) be a tower, whoſe height is required: to do this make choice of two ſtations, D and C, in the ſame right line with B; then meaſure the ſtationary diſtance D C, and with a quadrant, or other proper inſtrument, take the angles D and C, as before in acceſſible altitude. Now the two viſual lines D A and C A, together with the diſtance D C, form an oblique angled triangle, wherein there are given the three angles D, A C D, and D A C; for the difference of the obſerved angles is equal to the angle C A D. Therefore ſay, As the ſine of the angle C A D is to C D, ſo is the ſine of the angle A D C to A C. Then, radius : A C :: ſin < A C B : A B, the height of the tower required.

To find the inacceſſible ALTITUDE *of an Object ſtanding upon a Hill.* Let A K (plate IX. *fig.* 4.) be a tower upon a hill, whoſe height is required to be found on the plane at the foot of the hill: firſt make choice of two ſtations, as D, C, in a right line with the object, and at D take the angle A D B, then meaſure the diſtance D C, and at C take the angles A C B and K C B. Now, in the oblique triangle A D C, we have the baſe D C and the angles given, to find A C, (as in the foregoing propoſition) which being obtained, we ſhall have radius : A C :: ſin < B A C : B C, whence A B may be found; laſtly, as radius : tang. of the obſerved angle K C B :: B C : B K, which ſubtracted from A B, leaves A K the height required.

The method of taking conſiderable terreſtrial altitudes, of which thoſe of mountains are the greateſt, by means of the barometer, is very eaſy and expeditious. This is done by obſerving, on the top of the mountain, how much the mercury has fell below what it was at the foot of the mountain. See BAROMETER.

ALTO and BASSO, in law, denotes the abſolute ſubmiſſion of all differences high and low to ſome arbitrator.

ALTOM, a name given in ſeveral parts of the Turkiſh dominions to what the Europeans call a ſequin. See SEQUIN.

ALTO RELIEVO. See the article RELIEVO.

ALTO-REPIENO, in muſic, the tenor of the grand chorus, which ſings or plays only now and then in ſome particular places.

ALTUS, in muſic. See COUNTER-TENOR.

ALVARISTS, in eccleſiaſtical hiſtory, a branch of the Thomiſts, ſo called from Alvares their leader, who aſſerted the doctrine of ſufficient grace, inſtead of the efficacious grace of the ancient Thomiſts. See THOMISTS.

ALUCO, in natural hiſtory, a name by which ſome authors call the common white owl. See OWL.

ALUDE, a kind of coloured ſheep's leather dreſſed with the wool on.

ALUDELS, in chemiſtry, are earthen pots without bottoms, inſerted into each other, and uſed in ſublimations. See the article SUBLIMATION.

The firſt aludel is fitted to a pot, containing the matter to be ſublimed, and placed in the furnace; the ſecond aludel is adjuſted to the former; and in this manner any number of aludels, requiſite to the operation, are placed on each other, and the upper one fitted to a blind head, where the flowers that aſcend higheſt are retained.

ALVEARIUM, in anatomy, the hollow of the auricle, or external ear.

The word is Latin, and derived from *alveus*, a channel, or cavity.

ALVEOLUS, in natural hiſtory, ſignifies one of thoſe waxen cells which compoſe the combs in bee-hives.

Theſe cells ſerve both for ſtore-houſes, wherein the honey and wax for future uſe are depoſited, and alſo for niduſes to defend the embryo bees, while hatching. See BEE.

Perhaps there is not in nature a more remarkable inſtance of inſtinct, than in the conſtruction of theſe cells, it having been found that the form in which they are conſtructed, requires the leaſt wax to contain the ſame quantity of honey. See the article COMB.

ALVEOLUS, in anatomy, the ſocket-like cavity in the jaw, wherein each of the teeth are ſet.

ALVEOLUS, in botomy, a name given to each of the cells, containing the ſeeds of certain plants.

ALUM, *Alumen*, in natural hiſtory, a ſemi-tranſparent, auſtere, ſtyptic ſalt, compoſed of the vitriolic acid, and a certain earth, found in all the argillaceous foſſils hitherto examined.

The greateſt quantities of this ſalt are artificially produced from different kinds of minerals whoſe nature and compoſition are little known.

The reddiſh Roman allum is prepared from a reddiſh ſtone found at the bottom of the hill Tolfa, near Civita Vecchia, in the eccleſiaſtical ſtate. In Sweden and ſome parts of Bohemia, alum is made from pyritæ and other ores; in England, at Altſattel, and ſundry other places, from bituminous minerals of the pitcoal kind; at Solfatara near Naples, from a whitiſh earth; in Miſnia, from a blakiſh one; at Leowenberg near Freyenwalde, from a reddiſh one; and from different minerals at Saalfeld, Reichenbach, Leuſersdorff, Suſersdorff, Eliard, Schwentzel, Duben, &c. There are waters impregnated with alum, though few if any that leave a perfect alum on bare evaporation.

The pureſt and moſt perfect alum-ore is the reddiſh ſtone of Tolfa: this is ſaid to yield alum without any additional matter, though not without artificial management: the alum obtained from it is tinctured with the reddiſh colour of the ſtone. In its natural ſtate it gives no marks of allum; and if expoſed to the air, it continues a hard inſipid ſtone. Calcined or roaſted, and then laid for a time in the air, it becomes by degrees aluminous, and gives out its alum on being boiled in water. This is the alum which the Italians call *alum di rocca*, alum made from a ſtone or rock; among us, the name *alumen rupeum*, or rock alum, is often applied to the larger cryſtalline maſſes, whatever ſubject they have been prepared from.

The aluminous pyritæ and bitumens require no calcination, unleſs they greatly abound with ſulphur. Theſe minerals, at firſt taken out of the earth, are compact, and often bright and glittering: they have no manner of taſte, and diſcover no mark of their holding any thing ſaline; the vitriolic acid being as yet blended with an inflammable matter, by which its acidity and all its ſaline characters are deſtroyed. On bare expoſure to the open air, the inflammable principle is diſſipated, and the acid is combined with the aluminous earth into a perfect alum, the ſtone at the ſame time falling into powder.

The mineral, thus impregnated with alum, is elixated or boiled with water; the liquor boiled down, commonly with an addition of urine, or alkaline ley, or both together; the clear part poured off and ſet to ſhoot; the cryſtals, if not ſufficiently pure, diſſolved again, boiled down with a little more alkali, and cryſtallized afreſh. The uſe of the urine or alkali ſalt is partly to clarify the liquor, and precipitate ſuch metallic parts as it may contain, and partly to give a body to the alum and promote the cryſtallization; the liquor of itſelf would not ſhoot, but either continue fluid, or if futher evaporated, would yield only an unctuous maſs. Alkaline ſalts are found to anſwer better than urine, and hence are now in moſt places alone made uſe of, though ſome ſtill retain urine from prejudice and cuſtom. The alkali precipitates not only metallic matters, but a groſs earth which would injure the tranſparency of the ſalt, and often alſo a part of the aluminous earth itſelf, which falls to the bottom in form of a fine white meal, called at the works alum meal; this is to be rediſſolved and cryſtallized afreſh. The mineral remaining, after elixation, expoſed for ſome years to the air, becomes impregnated with alum again; in ſome places this proceſs is repeated a third and fourth time.

Some earths, as the alum earth of Solfatara, and the aluminous ſlates, have a manifeſt aluminous taſte when newly dug; and hence are directly elixated, without expoſure to the atmoſphere. In ſome kinds of ſlates we may plainly diſtinguiſh the aluminous matter lying in a powdery form, betwixt the flakes or ſcales of which the ſtone is compoſed. In general, where the mineral holds but little ſulphur, it is ſufficient to lay it for a time in the open air, defended from rain by a ſhed or ſlight covering; if it participates conſiderably of ſulphur, it muſt be previouſly calcined; if very rich in ſulphur, a part of the ſulphur is firſt extracted by ſublimation, and the reſiduum worked for alum.

The alum ſlates near York, in England, are conſiderably ſulphureous; by lying long in the air, they become aluminous of themſelves; but to promote this effect they are uſually calcined. The boilers are large leaden pans, nine feet long, five feet broad, and two and a half in depth; the liquor is clarified and diſpoſed to cryſtallize by the addition of ſoda, there called kelp, and of urine The alum ore of Schwentzel, near Duben in Saxony, above five miles from Hall, is likewiſe bituminous; this is firſt calcined, then expoſed to the air, elixated with water, and the liquor boiled down with potaſh. At Altſattel near Carlſbade, the workmen, formerly uſed only urine, of which they received conſtant ſupplies from the neighbouring towns and villages. The moſt curious alum-ore known is in Sweden; ſulphur, vitriol, and alum, being here obtained from one mineral, which appears to be a kind of pyrites. The ſulphur is firſt extracted by diſtillation; the reſiduum being ſtrongly calcined, boiled in water, the liquor duly evaporated and ſet to ſhoot, the vitriol cryſtallizes; the uncryſtallized liquor, treated with urine and a ley drawn from aſhes, yields alum.

The cryſtallization of allum is uſually performed in large ſtrong wooden caſks, whoſe ſtaves and hoops are all marked with numbers, that they may be readily put together; in ſome places iron veſſels are uſed. The caſks being filled with the alum liquor, evaporated to a due conſiſtence, and ſet in a cold place, the alum gradually ſhoots into large cryſtals about the ſides; the liquor in the middle is then let off by a cock in the bottom, the head of the caſk knocked out, and the veſſel turned upſide down, for the more effectual draining off of the remaining liquid. The cryſtals are then dried in a warm ſtove, and packed up in caſks; and the mother-ley, or uncryſtallized liquor, mixed with freſh aluminous leys The metallic or vitriolic alum-ores occaſion the greateſt trouble; and the alum obtained from them, though it appears white, is never totally free from ſome metallic impregnation. Conſiderable differences are found in alum, partly from this cauſe, and partly from its being prepared with urine or pot-aſh, or with freſh or ſtale urine. Theſe differences are chiefly obſerved by the dyers, and thoſe who prepare lakes for the painters.

Alum requires about ten times its weight of water to diſſolve it. The ſolution, if the alum was pure, makes no change in the colour of ſyrup of violets; but the common ſorts change the ſyrup green, by virtue of the alkaline ſalt employed in their preparation. Fixed alkalies, volatile alkalies, and borax, added to ſolutions of alum, precipitate the earth. Its taſte is nauſeouſly ſweetiſh and aſtringent. In cryſtallization, it ſhoots into large angular maſſes, conſiſting generally of eleven planes, five of which are hexangular and ſix quadrangular.

An ounce of alum contains about five ſcruples and a half of earth, one dram and eighteen grains of vitriolic acid, and nearly five drams of water. Great quantities of alum are uſed by the dyers, calico printers, &c. the former ſteeping and boiling their ſtuffs in a compoſition made with alum, tartar, and bran; and the latter print their linens intended for reds with a compoſition of alum and ſacrum ſaturni. See DYING, and CALICO *Printing*.

Burnt ALUM is nothing more than alum expoſed to the action of the fire; by which means it liquefies, and boils up like green vitriol; and when its phlegm is evaporated, forms a white ſpongy brittle maſs: by this treatment it loſes very little of its acid; and hence almoſt totally diſſolves again in water, and ſhoots into hard compact cryſtals as at firſt. The calcined or burnt alum, as it is called, proves ſharper in taſte than crude alum, on account of the loſs of its phlegm; and imbibes humidity from the air. Four ounces will, in the ſpace of a month, gain an increaſe of one ounce. Dr. Rhuon expoſed equal quantities of burnt alum, for equal lengths of time, in a damp cellar, and in a dry upper room; the firſt gained half an ounce; the latter only five ſcruples.

If we attempt to extract the phlegm and acid of alum by diſtillation, we muſt either inject the alum by a little at a time into a tubulated retort, or put it into a common retort, of which it may fill no more than one half, and apply the fire in ſuch a manner, that the matter may be heated firſt on the ſurface, and thence gradually to the bottom. Though the fire is kept up ſtrong for a conſiderable time, we can ſcarce gain more than half the weight of the alum of a phlegmatic ſpirit. The reſiduum, expoſed to the air, imbibes moiſture, and then yields more of an acid ſpirit, the phlegm ſerving for a vehicle to the acid. Alum, diſſolved repeatedly in vinegar, parts with its water more eaſily than at firſt: it now calcines into a white mealy powder, in a warm room, or by the heat of the ſun.

ALUM *Water*, a compoſition uſed by thoſe who colour prints, &c. and made in the following manner:

Take three ounces of alum, and boil it in a quart of rain or river water, till the ſalt is diſſolved. Then take it from the fire, and after ſtanding twenty-four hours to ſettle, pour off the clear liquor for uſe.

With this water they waſh their prints in order to prevent the colours from ſinking into the paper, and give them a brightneſs which they would otherwiſe want.

ALUMINOUS, an epithet applied to ſuch things as partake of the nature or properties of alum.

ALUMINOUS *Water*, thoſe impregnated, either by nature or art, with the virtues of alum. The ſpa at Scarborough is ſaid to be of the former kind.

ALSUS, in anatomy, the lower belly or venter. See ABDOMEN.

ALYSOIDES, in botany, a diſtinct genus of plants, with cruciform flowers, and elliptical fruit, divided by an intermediate membrane into two cells, which contain a conſiderable number of ſmall roundiſh ſeeds.

ALYSSON, or ALYSSUM, in botany, is the name of a genus of plants called in Engliſh mad-wort: the flower is of the cruciform kind, and conſiſts of four leaves; the fruit is a roundiſh capſule, divided into two cells, in which are contained a number of ſmall roundiſh ſeeds.

This plant is ſaid to be aperitive and diaphoretic; but is ſeldom uſed at preſent.

ALYTARCHA, a prieſt of Antioch, who preſided in the games inſtituted in honour of the gods, over the alutai, or officers who kept order and decency at theſe feſtivals.

The word is Greek, and compounded of αλυται, and αρχος, chief.

AMA, among eccleſiaſtical writers, implies a veſſel in which wine or water were kept for the ſervice of the euchariſt.

AMABYR, a barbarous cuſtom which formerly prevailed in ſeveral parts of England and Wales, being a ſum of money paid to the lord, when a maid was married within his lordſhip.

The word is old Britiſh, and ſignifies "the price of "virginity."

AMAIN, in the ſea language, ſignifies at once. Thus to lower amain, is to lower at once, or let go the fall of the tackle.

AMALGAMA, in chemiſtry, a maſs of mercury united and incorporated with ſome metal.

The word is formed from the Greek, *αμα*, together, and *γαμεω*, to join.

AMALGAMATION, in chemiſtry, the operation of making an amalgama, or mixing quickſilver with ſome metal.

Trituration is often ſufficient to make an amalgama; but a proper degree of heat is alſo of very conſiderable uſe.

Mercury, amalgamated with a metal, gives it a conſiſtence more or leſs ſoft, and even fluid, according to the greater or ſmaller proportion of mercury employed. All amalgamas are ſoftened by heat, and hardened by cold.

Mercury is very volatile; vaſtly more ſo than the unfixed metals: moreover, the union it contracts with any metal is not ſufficiently intimate to entitle the new compound reſulting from the union to all the properties of the two ſubſtances united; at leaſt with regard to their degree of fixity and volatility: from all which it follows, that the beſt and ſureſt method of ſeparating it from metals diſſolved by it, is to expoſe the amalgama to a degree of heat ſufficient to make all the quickſilver ariſe and evaporate; after which the metal remains in the form of a powder, and being fuſed recovers its malleability. If it be thought proper to ſave the quickſilver, the operation muſt be performed in cloſe veſſels, which will confine and collect the mercurial vapours.

Of all metals, gold unites with mercury with the greateſt facility; next to that, ſilver; then lead, tin, and every metal, except iron and copper, the laſt of which incorporates with quickſilver with great difficulty, and the former ſcarce at all.

The amalgama of gold is thus made: take a dram of the regulus of gold, beat it into very thin plates, and upon theſe, heated in a crucible red hot, pour an ounce of quickſilver, ſtir the matter with an iron rod, and when it begins to fume, caſt it into an earthen pan filled with water, and it will coagulate and become tractable. Gold will retain about thrice its weight of mercury.

To make an amalgama of lead: melt clean lead in an iron ladle, add to it an equal weight of melted mercury, ſtir them together with an iron rod; then let them cool, and you will have an uniform maſs of a ſilver colour, ſomewhat hard, but growing ſofter and ſofter by trituration. Put this maſs into a glaſs mortar, grind it, and mix with it any quantity of mercury at pleaſure, and it will unite with it, as ſalt with water.

The amalgama of tin is made exactly in the ſame manner, and this alſo may be diluted by the addition of mercury.

To have an amalgama of copper: take a ſolution of pure copper, made in aquafortis, ſo ſtrong that the aquafortis could diſſolve no more of the metal; dilute the ſolution with twelve times its quantity of fair water; heat the liquor, and put into it poliſhed plates of iron, and the copper will be precipitated in a powder to the bottom, while the iron will be diſſolved: proceed thus till all the copper is fallen; pour off the liquor, waſh the powder with hot water, till it becomes perfectly inſipid; then dry the powder, and grind it in a glaſs mortar with an equal weight of hot quickſilver, and they will unite into an amalgama, which will alſo receive a further addition of mercury. An amalgama of copper, in any other way, is very difficult to make.

Pure ſilver, precipitated from aquafortis, may in the ſame manner be made into an amalgama.

From theſe operations we may perceive that the making of amalgamas is the foundation of the art of gilding, both on gold and ſilver; and that metals, by that art, may be mixed, confounded, and ſecretly concealed among one another.

AMALTHEA, in mythology, the goat that ſucked Jupiter, and was afterwards placed by that god among the ſtars.

AMANUS, in mythology, a god of the ancient Perſians. It is ſuppoſed to have been the ſun, whom they worſhipped under the image of the perpetual fire.

AMARANTA, or **AMARANTE**, an order of knighthood, inſtituted in the year 1653, by Chriſtina, queen of Sweden, in memory of a maſquerade, in which ſhe had aſſumed that name, which ſignifies unfading, or immortal.

AMARANTHUS, in botany, the name of a genus of plants, ſometimes called prince's-feather, the flower of which is roſaceous, and the fruit an oval capſule, containing only one large ſeed of a roundiſh compreſſed ſhape. See plate IV. *fig.* 10.

All the ſorts of amaranthus muſt be ſown on a good hot bed, in February, or the beginning of March at fartheſt; and in about a fortnight's time (if the bed is in good temper) the plants will riſe; when you muſt prepare another hot-bed, covered with good rich light earth, about four inches thick; then raiſe up the young plants with your finger, ſo as not to break off the tender roots, and prick them into your new hot-bed, about four inches diſtance every way, giving them a gentle watering to ſettle the earth to their roots; but in doing this, be very curious not to bear the young plants down to the ground by haſty watering, which rarely riſe again, or at leaſt ſo as to recover their former ſtrength in a long time, but very often rot in the ſtems, and die quite away.

The amaranthus tricolor and bicolor muſt be kept longer under the frames than the cock's combs; and, in order to have them very beautiful, it will be proper to make a freſh hot-bed in a glaſs caſe; or, where ſuch a conveniency is wanting, to erect ſome of the lights which were placed over cucumbers, round an hot bed, and cover thoſe with the ſame lights on the top, ſo as to reſemble a glaſs ſtove. On this hot-bed you ſhould place your amaranthus at ſuch a diſtance from each other, as to allow them room to ſpread; obſerving to refreſh them often with water, and in warm weather let them have plenty of freſh air. With this management the plants may be raiſed five or ſix feet high, and their leaves will come to the moſt beautiful colour; after which they may be expoſed to the open air, and removed to adorn the ſeveral parts of the garden. *Miller's Dict.*

AMARANTHOIDES, in botany, a diſtinct genus of plants, with floſculous flowers collected into a ſquamoſe head, and a roundiſh fruit.

AMATORII *Muſculi*, in anatomy, thoſe muſcles of the eye that draw it ſideways, and aſſiſt the look called ogling.

AMAZON, in antiquity, a bold daring woman, whoſe breaſts have been cut off to render her more proper for fighting. In a more limited ſenſe, it implied one of the ancient nation of women, who inhabited that part of the Leſſer Aſia, now called Amaſia. We alſo read of Scythian, German, Lybian, and American amazons.

AMAZONS, in a figurative ſenſe, is an appellation given to bees from their being governed by a queen.

AMBASSADOR, a perſon ſent in a public character from one ſovereign to another.

The word is derived from the low Latin, *ambaſciator*, formed from *ambactus*, which among the ancient Gauls ſignified ſervant, client, domeſtic, or officer.

Ambaſſadors are either ordinary or extraordinary.

AMBASSADOR *Ordinary* is a perſon reſiding at another court for keeping up a good intelligence between the two powers, taking care of the intereſt of his maſter, and negociating ſuch affairs as may occaſionally happen. Ambaſſadors of this kind have not been known above two centuries; before that time all ambaſſadors were extraordinary, and retired as ſoon as they had finiſhed the affair they were ſent to negotiate.

AMBASSADOR *Extraordinary* is a perſon ſent to the court of a foreign power, on ſome particular and preſſing affair, as to conclude a peace, or a marriage, make a compliment, &c.

In fact, there is no eſſential difference between ambaſſadors ordinary and extraordinary, the motive of their ambaſſies alone diſtinguiſhes them: they are equally entitled to the privileges given to ambaſſadors by the law of nations.

The name of ambaſſador, ſays Cicero, is ſacred and inviolable. And this has always been the opinion of all nations; for we find that David thought the affront offered to his ambaſſadors, a ſufficient reaſon for making war againſt the Ammonites; and Alexander put the inhabitants of Tyre to the ſword for inſulting his ambaſſadors.

AMBERVALIA, in antiquity, a ceremony among the Romans: when, in order to procure from the gods an happy harveſt, they conducted the victims thrice round the corn fields, in proceſſion, before they were ſacrificed.

AMBE, among ſurgeons, is the name of an ancient inſtrument for reducing a diſlocated ſhoulder.

This inſtrument has received various improvements at different times, and by different authors. Mr. Freke, late ſurgeon to St. Bartholomew's hoſpital, both improved the machine, and rendered it portable; we ſhall therefore give a deſcription of the ambe, according to his conſtruction.

This machine, (repreſented on plate IX. *fig.* 9.) which conſiſts of two boxes, A, A, joined at the ends by two hinges, contains, when folded together, every thing that can poſſibly be wanted in reducing a diſlocated ſhoulder; and it may ſo eaſily be made uſe of, without the aſſiſtance of any other than the ſurgeon employed, that (ſays the ingenious author) I may venture to affirm, a patient may be ſet down, the inſtrument applied, and the ſhoulder reduced, in one minute, ordinarily ſpeaking.

The length of this inſtrument, when ſhut up, is one foot eight inches, its breadth nine inches, and its thickneſs three inches and a quarter. When it is opened, it is kept ſo by two hooks fixed on the backſide of it; and when one end of it ſtands on the ground, the other ſtands high enough to become a fulcrum, or ſupport of the lever B B, which is fixed on a roller *b*, by a large woodſcrew, which turning ſideways, as well as with the roller, it obtains a circumrotatory motion; ſo that it will ſerve to reduce a luxation, either backward, forward, or downward.

The roller, on which the lever is fixed, is juſt the diameter of the depth of one of the boxes, into which are driven two iron pins, the ends of which are received by the two ſides of the box, which are an inch thick.

The lever is two feet four inches long, and is cut off and joined again by two hinges C, to fold up ſo as to be contained in the boxes. On the backſide of it is a hook to keep it ſtraight; the other end of it is to hang over the roller about an inch and a half, which is to be excavated and covered with buff leather, for the more eaſy reception of the head of the os humeri.

Two iron cheeks D, are ſcrewed on each ſide of the lever, to receive through them an iron roller, which has two holes through it to receive two cords coming from a brace F, fixed on the lower head of the os humeri; for on no other part of the arm above the cubit can a bandage for this purpoſe be uſeful; for, if it be applied on the muſcular part of the arm, it never fails ſlipping down to the joint before you can extend the limb.

The iron roller has a ſquare end, on which is fixed a wheel G, within the cheek notched round, which works as a ratchet, on a ſpring catch underneath the lever, by which it is ſtopped, as you wind it with a winch; and may at pleaſure be let looſe, as there ſhall be occaſion for it, by diſcharging the catch. We come now to deſcribe the brace F, which, compared with common bandages, is of more conſequence than can eaſily be imagined by unexperienced perſons. It conſiſts of a large piece of buff leather, big enough to embrace the arm, ſewed on two pieces of ſtrong iron curved plates, riveted together, one of them, having an eye at each end to faſten two cords in; the other is bent at the ends into two hooks, which are to receive the cords, after they have croſſed over the arm above.

In order to keep the patient ſteady in his chair from coming forward, or letting the ſcapula riſe up on depreſſing the lever, after the limb is extended by the winch, there muſt be fixed over the ſhoulder a girth with two hooks at the ends of it, long enough to reach to the ground on the other ſide, where it muſt be hooked into a ring I, ſcrewed into the floor for that purpoſe. *Philoſophical Tranſactions.*

Ambe, among anatomiſts, implies the ſuperficial jutting out of a bone.

AMBER, *ſuccinum*, or *electrum*, in natural hiſtory, a pellucid and very hard inflammable ſubſtance, of an uniform ſtructure, a bituminous taſte, a very fragrant ſmell when rubbed, and highly endowed with that remarkable property called electricity.

Amber is a ſolid mineral bitumen; not as ſome have ſuppoſed a vegetable reſin, or inſpiſſated juice, introduced into cavities in the earth, and there indurated and ſomewhat changed in its quality; nor is it a true marine production, though ſometimes found in the ſea.

This bitumen is met with plentifully in regular mines in ſome parts of Pruſſia; the upper ſurface is compoſed of ſand, under which is a ſtratum of loam, and under this a bed of wood, partly entire, but chiefly mouldered or changed into a bituminous ſubſtance; under the wood is a ſtratum of vitriolic or rather aluminous mineral, and under this another bed of ſand, in which the amber is found. Strong ſulphureous exhalations are often perceived in the pits. Helving relates, that wherever there is amber, there is always a bituminous earth and foſſil wood, a gravelly matter, vitriol, nitre, and ſulphur; and that the matter of the amber reſides in the foſſil wood. The obſervation appears to be juſt, except in regard to nitre, which is never found in the amber pits; ſome aluminous matter was doubtleſs miſtaken for nitre. Conſiderable quantities are met with alſo in the ſea, near the amber ſhores, particularly after a ſtorm, the ſea having probably waſhed out the mineral from the earth.

The principal amber pits are in the territory called Sandlande, between Pillau and Fiſchhauſen, near the villages Groſshubenick, Groſsdirſchken, Warnicken, Strobſchner, Rittener, Palmnick, &c. The ſhores on which amber is chiefly fiſhed for, are thoſe called Krecke, Nodens, Laſſnick, Knick, Krapellen, Krackſtepellen, Crimichen, and Thieſkim or Bruſterort. The manner of fiſhing for it is pretty well deſcribed in *Hartmann's Hiſtoria Succini Pruſſici.* The digging of amber is a very dangerous work; the ground not being ſtony or rocky as in metallic mines, but ſandy or loamy, and hence very ſubject to fall in when hollowed underneath. His Pruſſian majeſty receives a large annual revenue from this commodity: he has a peculiar council called the amber-chamber; and no one but thoſe appointed for that purpoſe is permitted to dig or fiſh for amber in his dominions. Small quantities of amber are met with alſo in Bohemia, Sileſia, Saxony, Hungary, France, &c. The pieces of amber now and then found in theſe places were not perhaps originally produced there, but carried thither by the flood.

Various kinds of ſubſtances are often encloſed in maſſes of amber, as drops of water, which paſs from ſide to ſide upon moving the maſs, ſmall bits of wood, moſs, leaves of plants, &c. a variety of inſects, particularly gnats, flies, ſpiders, ants, moths, butterflies, graſshoppers, bees, worms, cantharides, caterpillars, crickets, maggots, lice, and fleas. There are reports alſo of frogs, vipers, fiſhes, and other large animals being found in maſſes of amber, and ſuch are figured in *Mercatus's Metalotheca*; but moſt of theſe are artificial preparations; even the fiſh in amber, in his Pruſſian majeſty's Repoſitory, is manifeſtly factitious. The generality are however natural. Hence it is evident, that this bitumen has once been in a fluid ſtate, though we cannot conclude that it ever was a liquid or oily matter, and acquired its conſiſtency and ſolidity by degrees. Appearances are rather contrary to this ſuppoſition. The inſects found in amber have nothing of thoſe ſtrained or diſtorted poſtures which animals are naturally thrown into upon endeavouring to diſengage themſelves when entangled in a viſcous liquid. We often ſee pieces of amber in which there are perfect flies, with the wings and feet beautifully expanded as if they were ſtill flying. It is therefore moſt probable that the amber was generated inſtantaneouſly from the concourſe of mineral oil or petroleum, with vitriolic acid, in the form of vapours, which at once concreted together, and embalmed the inſects that happened to lye in their way, with a more durable and precious covering than has ever fallen to the lot of the moſt magnificent monarchs.

A bituminous wood is conſtantly to be met with in the Pruſſian amber pits: this however does not appear at all neceſſary to the formation of amber; for that bitumen is alſo found in Italy, where foſſil wood is unknown, but plenty of mineral oil or petroleum.

There are different ſorts of amber in regard to external appearance; opake and tranſparent; white or whitiſh, yellowiſh or yellow, greeniſh, browniſh, bluiſh, reddiſh, or browniſh red; what is called black amber is no true amber, but a bitumen of the pit-coal, aſphaltum, or jet kind. Some divide amber into native and factitious. There are indeed artificial maſſes reſembling amber in appearance; but no true amber has hitherto been produced by art. In Holland, a vegetable reſin, whoſe proper name is gummi de loock, is ſold under the name of American amber: this, when in conſiderable maſſes, and by itſelf, is eaſily diſtinguiſhed from the genuine amber, by its having leſs electricity, wanting the peculiar ſtrong ſmell which amber emits in burning, by its greater ſolubrity in ſpirit of wine, and not yielding the ſame principles as amber in diſtillation: ſmall pieces of the reſin, mixed among true amber, are diſcovered with more difficulty; and this abuſe is not unfrequently practiſed.

Amber is divided by the workmen into different aſſortments, according to the ſize of the maſſes; the ſmalleſt and coarſeſt bits are called ſandſteiri; the ſomewhat larger, ſchlug; thoſe which are ſtill larger, firniſs, or varniſh amber; the pieces which are large enough to be turned into beads, or other ornaments or utenſils, are named from the works for which they are judged to be fit. There are other diviſions taken from the quality of the maſſes. Of the opake ambers, the moſt valuable is the flaky or ſcaly; next to this the undulated waved; and next in order the cloudy, the cauliflower or pearl-like, the milky, the citron yellow, the wax coloured, the dark yellow, the browniſh, and the dark brown, which laſt is the coarſeſt of all. The tranſparent ambers are divided into reddiſh, gold yellow, like a yellow glaſs, citron yellow, pale yellow, and whitiſh. Of all theſe there are ſeveral ſubdiviſions, commixtures, or intermediate ſhades; and ſometimes we meet with pieces of other colours, as greeniſh, bluiſh, coffee-coloured, opal-coloured, &c. With regard to the tranſparent ambers, it may be proper to take notice, 1. That inſects or other foreign bodies are obſerved chiefly in theſe; poſſibly they may often be lodged alſo in opake amber, though the opacity of the maſs prevents our ſeeing them. 2. That opake amber is capable of being made tranſparent by art; and hence that all our tranſparent ambers were not naturally ſuch. 3. That the fine gold yellow tranſparent ſort is entirely natural; the common methods of improving the tranſparency, weakening the colour. There are means of communicating to amber a variety of colours: one Somnelſon, an excellent artiſt at Breſlau, not only made opake amber tranſparent, but tinged it red, blue, violet, of a purpliſh, green, and white; and cut it into brilliants, necklaces, ear-pendants, bracelets, &c. in imitation of precious ſtones; as alſo into ſpectacles, microſcopes, priſms, burning lens's, &c. of which an account may be ſeen in the Breſlau collections. 4. That amber clarified by art is always harder, and leſs electric *than* in its natural untranſparent ſtate.

Schroder relates, that yellow amber is made white by boiling the ſalt-water; and later writers have copied this account: on trial, however, ſalt-water is not found to have any ſuch effect. The workmen have two methods of clarifying amber; one by ſurrounding the amber with ſand in an iron pot, and cementing it with a gradual fire for forty hours; ſome ſmall pieces placed near the ſides of the veſſel being occaſionally taken out for judging of the effect of the operation. The ſecond method, which is that moſt commonly practiſed, is by digeſting and boiling the amber about twenty hours in rape-ſeed oil, by which it is rendered both clear and hard; treated in the ſame manner with linſeed oil, it does not become clear.

Sendelius informs us, that he clarified pieces of cloudy amber, by applying them to the flame of a candle, and rubbing them now and then with tallow; and that opake pieces, boiled with fleſh and with fiſh, ſhewed a diſpoſition to become clear. The moſt deſirable point in the manufactures of amber would be, to find a method of melting ſmall pieces into a large one; but all attempts of this kind have hitherto miſcarried.

It is no ſmall piece of art to procure a total ſolution of amber; various methods have been tried with alkalies, acids, oil, inflammable ſpirits, dulcified ſpirits, balſams, and other menſtrua, without the wiſhed for ſucceſs. Hoffman relates, that he has diſſolved amber by two methods; one by putting two parts of oil of almonds, and one of powdered amber, into a glaſs veſſel, and ſetting the veſſel in Papin's digeſter, filled about one third with water; the cover of the digeſter being ſtrongly ſecured, and a moderate fire kept up for above an hour, the amber was reſolved into a tranſparent gelatinous maſs, on the ſurface of which floated a little fluid oil. The other method conſiſted in boiling powdered amber in water, with an equal weight of cauſtic nitre; this corroſive alkali occaſioning, he ſays, almoſt all the amber to be diſſolved. Theſe experiments muſt be left to future trials: we ſhall however obſerve, that neither of them proved entirely ſatisfactory. Henckel has carried the affair much farther, pretending to prepare amber, without burning, and without alkalies, ſo as to diſſolve totally in ſpirit of wine: of this aſſertion we can form no judgment till the fact is produced. Of the common menſtrua, there is not one which totally diſſolves this concrete: in Papin's digeſter, the amber perhaps is only ſoftened. Moſt liquors however extract ſome portion of it. A tincture made in vinous ſpirits is kept in the ſhops. Some have thought it to promote the action of the ſpirit by fixed or volatile alkaline ſalts: but theſe kinds of additions give very little, if any, aſſiſtance to the ſpirit as a menſtruum, and are accompanied with an inconvenience of rendering the tincture unfit for the chirurgical uſes to which it is commonly applied. Highly rectified ſpirit of wine extracts of itſelf a ſufficiently ſtrong tincture from amber: the admixture of alkaline ſalts deepens the colour of the liquor, without increaſing the quantity taken up. If the ſimple tincture is required to be more ſaturated with the amber, it may be eaſily rendered ſo by drawing off a part of the ſpirit, which may be reſerved for the like uſes again, as being impregnated with the more ſubtile parts of the amber. If the ſpirit be totally abſtracted, a balſamic matter or reſin is left in the form of an extract. This is employed by ſome as an ingredient in compoſitions for pills. Water mixed with the tincture renders it turbid; but ſcarce any precipitation enſues: though in ſeveral books of pharmacy a magiſtery of amber is directed to be prepared by this means.

Oil and Salt of AMBER. Amber melts and burns in the fire, and emits a ſtrong peculiar ſmell. Diſtilled in a ſtrong heat it yields a phlegm, an oil, and a particular ſpecies of volatile ſaline matter. The diſtillation is performed in earthen or glaſs retorts, frequently with the addition of ſand, powdered flints, bricks, lime, elixated aſhes, bole, loam, pumice, ſea-ſalt, coals, &c. Conſiderable differences are obſerved in the products, according to the additions made uſe of; with ſome the ſalt proves yellowiſh and dry, with others browniſh or blackiſh, and unctuous or ſoft like an extract; with ſome the oil is throughout of a dark brown colour, with others it proves externally green or greeniſh, with elixated aſhes in particular, of a fine green. The quantity of oil and phlegm is greateſt when coals, that of ſalt when ſea ſalt is uſed. The common addition is ſand, of which two parts are mixed with two or one of amber in coarſe powder. Thoſe whoſe ſole buſineſs is to diſtil amber in Pruſſia, and whom long experience has taught the moſt advantageous methods of doing it, uſe no addition. The Engliſh chemiſts likewiſe diſtil their amber without addition, and ſell their reſiduum to the japanners, who prepare from it the fineſt black varniſh. See the article VARNISH.

In order more perfectly to collect the ſalt, which is the moſt valuable product in this operation, the Pruſſian workmen frequently change the receiver during the diſtillation, and keep apart the phlegm and the light oil which ariſe at firſt. They purify the ſalt by placing it for a time upon bibulous paper, which abſorbs a part of the oil, and changing the paper ſo long as it receives any oily ſtain. Where a further depuration is required, the ſalt is to be ſcraped out as clean as poſſible from the neck of the retort, or wherever elſe it has concreted, and waſhed off with water. The whole diſtilled matter is then to be mixed with a conſiderable quantity of hot water, the mixture well ſtirred together with a wooden ſpatula, the water, after ſettling, poured off, and freſh parcels of hot water added, to extract all the ſaline matter that may be retained by the oil: the ſalt ſeparated at firſt is to be diſſolved in this liquor, the ſolution filtrated, evaporated in glaſs veſſels to a proper pitch, and then ſet in the cold; the ſalt will ſhoot into fine ſpongy cryſtals, which may be gently dried upon bibulous paper: the remaining liquor may be further inſpiſſated and cryſtallized afreſh, or evaporated to dryneſs. The ſalt obtained by theſe laſt proceſſes will turn out browner and browner, and is therefore to be reſerved for inferior purpoſes, or further purified by repeating the ſolution, filtration, and cryſtallization. This ſalt may alſo be purified by ſublimation. It efferveſces with alkalies and abſorbent earths, and forms with them compound ſalts ſomewhat reſembling thoſe made with vegetable acids; its acid matter ſeeming to have a conſiderable analogy to the acid of the vegetable kingdom, and being eſſentially diſtinct from the three called mineral acids: mixed with acids, it makes no ſenſible commotion. By theſe characters this ſalt may be diſtinguiſhed from all the other matters that have been mixed with or vended for it. With regard to its virtues, it is accounted aperient, diuretic, and antihyſteric: its great price has prevented its coming much into uſe, and probably its real virtues, though doubtleſs conſiderable, fall greatly ſhort of the opinion that has been generally entertained of them.

The oil of amber is rectified by diſtilling it over, either by itſelf, or with different additions, as burnt bones, lime, elixated aſhes, chalk, tobacco pipe clay, potaſh, &c. The beſt method is to diſtil it with common water, and repeat the diſtillation ſeveral times with freſh parcels of water; by this method we obtain a clear limpid oil, a large quantity of thick pitchy matter remaining behind. This oil has a ſtrong bituminous ſmell, and a hot pungent taſte; and approaches more to the nature of the mineral petrolea than of the vegetable or animal diſtilled oils. It is ſometimes given internally, in doſes of ten or twelve drops, as an antihyſteric and emmenagogue; and ſometimes employed externally in antihyſteric, paralytic, and rheumatic liniments, or unguents.

AMBERGRIS, *Ambrogriſea*, in natural hiſtory, a marine bitumen, about the conſiſtence of wax, of a laminated ſtructure, as if the maſs was formed by a ſucceſſive oppoſition of matter.

It is ſometimes found in the waters of the ſea, ſometimes thrown out upon the ſhores, and ſometimes met with in the ſtomachs of whales and other fiſhes, frequently intermixed with little bones, claws of birds, and other like matters.

Theſe circumſtances have given riſe to many ridiculous opinions concerning its origin, as its being the excrement of birds or fiſhes, generated in the ſtomachs of fiſhes like bezoar, being a ſort of wax produced by bees upon rocks, &c.

The greateſt quantities of ambergris are met with in the Eaſt-Indies, about the iſland Madagaſcar, the Molucca iſlands, Mauritius and Neykotaries, the weſtern Sumatra iſlands, about the iſland Borneo and Cape Comorin, near Malabar, and on the Ethiopian coaſt, which, from Solaſa to Brana, is ſaid to be very rich in ambergris. Pieces are ſometimes met with of an extraordinary ſize. Chevalier and Garcias mention a piece weighing no leſs than three thouſand pounds, found in 1555 at Cape Comorin, and ſold for aſphaltum; and Joh. Hugo von Lindſchott informs us, that a maſs of thirty quintals was found at the ſame Cape. Monaides and Franciſcus Hernandez mention a piece of an hundred pounds; Garcias, one as large as a man, and another which was ninety palms in length and eighteen in breadth; Montanus, one of an hundred and thirty pounds; Kempfer, one exceeding that weight, found in his time in the province of Kino kuni, in Japan. The Dutch Eaſt-India company purchaſed of king Tidori in 1693, for eleven thouſand rixdollars, a piece of ambergris, weighing one hundred and eighty-two pounds, which was kept many years at Amſterdam, and ſeen by thouſands; but afterwards broken and ſold in pieces. It was of the ſhape of a tortoiſe, and meaſured five feet eight inches by two feet two. Nicholas Chevalier has given a particular deſcription of it in a Treatiſe printed at Amſterdam in 1700.

Ambergris is of various colours, aſh-coloured, whitiſh, yellowiſh, blackiſh-grey, brown, black, ſtreaked, and ſpotted. The pieces which have been ſwallowed by fiſhes are the leaſt eſteemed, as receiving an ill ſmell from the animal. The quite blackiſh and the quite whitiſh are to be rejected; and thoſe which are ſmooth and of an uniform texture, we may ſuſpect of being counterfeits. The aſh-grey coloured ambergris, with whitiſh, blackiſh, and yellowiſh ſtreaks or ſpecks, is accounted the beſt, eſpecially when intermixed with beaks of birds, bits of cuttle-bone, or other like matters; not that theſe are eſſential to the ambergris, but they are marks of its being genuine. The beſt ambergris is light, like wax to the touch, crumbly, yet ſomewhat tenacious, ſo as to ſtick to the mortar or peſtle; it has an agreeable ſmell, but no remarkable taſte: it eaſily melts in the fire, takes flame from a candle, and burns away without intermiſſion.

Ambergris is counterfeited or adulterated with wax, reſin, ſtorax, benzoine, amber, labdanum, muſk, civet, aloes wood, old decayed aſh-wood, rice meal, tree moſs, and other like ſubſtances. Theſe abuſes are eaſily detected. The counterfeit ſorts are commonly uniform throughout, both in colour and texture, like a paſte or maſs of pills, which the genuine ambergris never is. The former commonly ſoftens ſooner in the warm hand, and never have the true ambergris ſmell, no art being able to perfectly imitate this. The ſmell is moſt readily diſtinguiſhed in melting the ambergris on burning coals, or in a ſilver ſpoon over a candle, or in the flame; it ſmells at laſt like burning amber, but not ſo ſtrong. The true ambergris bubbles up in melting, and after fuſion appears brown. Some judge of its genuineneſs from the appearance of a matter, like melted reſin upon piercing the maſs with a red-hot needle, or other ſlender inſtrument. Menſtrua likewiſe afford ready methods of diſtinguiſhing the genuine from the ſophiſticated.

Ambergris melts in boiling water like a reſin, and communicates to the liquor a little of its ſmell, which ariſes along with the water in diſtillation. It diſſolves in linſeed oil, if the ambergris be previouſly melted, and the oil freed from water. It has been hitherto looked upon as exceedingly difficult, and not at all totally ſoluble in ſpirit of wine: the ſpirit being ſuppoſed to extract only a ſmall part, as it does from amber. It has however been found that this menſtruum may be made to diſſolve ambergris both readily and totally. If ambergris, broke in pieces, be put into twelve times its weight of a good tartarized ſpirit of wine, or of a plain highly rectified ſpirit, the ſpirit will extract little till it begins to boil, but will then quickly diſſolve the whole of the ambergris, except its impurities. If the ſpirit be impregnated with any eſſential oil, whether by drawing it over from oily vegetables, or by adding the oil itſelf, it will diſſolve ambergris more readily, and in a leſs degree of heat than would otherwiſe be neceſſary. The rectified oil of amber has been alſo tried, and found to promote the action of the ſpirit; but the expreſſed oils, recommended by Schroder, have no effect. The tincture made in tartarized ſpirit is of a deep reddiſh colour; that made in pure ſpirit ſcarcely any. The reſiduum appears of a large volume, though when dried proves to be only a very ſmall quantity of a fine earthy matter, amounting when the ambergris is free from viſible impurities, to a grain or two upon two ſcruples. It is probable that ambergris has often been diſſolved, though the paleneſs of the ſolution and apparent bulk of the reſiduum have induced the operator to think otherwiſe. In keeping the tincture or ſolution, if the veſſel be looſely ſtopt, ſo as to ſuffer a part of the menſtruum to exhale, a proportionable quantity of the ambergris precipitates, in form of a white unctuous ſubſtance, like tallow, ſoluble again upon adding more ſpirit. Lemery looked upon this as wax, and hence endeavoured to prove that ambergris proceeded from the labour of bees.

Dr. Grimm gives an analyſis of ambergris by diſtillation

tion in the *Ephemerides naturæ curioſorum.* An ounce diſtilled in a glaſs retort, yielded firſt an aqueous liquor, then, as he calls it, a ſpiritual liquor, afterwards a yellow oil with a ſmall quantity of volatile ſalt, a pitch-like matter remaining in the retort. He obſerves, that the liquor, the oil, the ſalt, and the reſiduum, were all ſimilar to thoſe obtained from amber, except that the oil was in ſmell more agreeable.

This analyſis of ambergris confirms the opinion that this concrete, whoſe origin was formerly ſo much diſputed, is truly a bitumen of the amber kind.

Ambergris is uſed principally as a perfume, in balſams, ſnuffs, dentifrices, hair-powders, waſh-balls, &c. It was formerly held in ſome eſteem as a medicine, and ſaid to poſſeſs nervine, analeptic, aphrodiſiac, cephalic, and other virtues; but is at preſent little regarded. A tincture of it is ſometimes prepared with ſpirit of roſes. This ſpirit has no advantage as a menſtruum for the ambergris above ſimple ſpirit of wine, though it may in ſome caſes be an uſeful addition in point of ſcent; ſolutions of ambergris by itſelf having very little ſmell. And hence it is uſed as an ingredient for heightening the odours of other bodies, as aromatic waters, ſpirits, &c. The principal ſecret in this operation conſiſts in adding the perfume ſo ſparingly, that while it heightens and improves the ſmell of the ſubſtance it is joined with, it may not betray its own. A few drops therefore of the tincture of ambergris may be very advantageouſly added to any of the odoriferous waters, as hungary, lavender, &c. Common water diſtilled from ambergris proves conſiderably impregnated with its fragrance.

AMBIDEXTER, a perſon who uſes both hands alike, and with the ſame dexterity.

The word is Latin, *ambidextra*, and compounded of *ambo*, both, and *dextra*, right hand.

Ambidexter, among lawyers, implies a juror who receives money from both parties for giving his verdict.

AMBIGENAL *Hyperbola*, a name given by Sir Iſaac Newton, in his *Enumeratio Linearum tertii Ordinis*, to one of the triple hyperbolas of the ſecond order, having one of its infinite legs falling within an angle formed by the aſymptotes, and the other without that angle. As let AC, CD, (plate X. *fig.* 1.) be two aſymptotes, and E E G F one of theſe hyperbolas; then if the infinite leg G E falls within the angle A C D, and the infinite leg G F without that angle, the ſaid hyperbola is called *ambigenal*.

AMBIGUITY, in grammar and rhetoric, a defect in language, whereby words are rendered ambiguous, or capable of a double meaning.

The word is Latin, and compounded of *ambo*, both, and *ago*, to carry.

AMBIT, *Ambitus*, of a figure, in geometry, is the perimeter or ſum of all the lines that include it.

AMBLE, or Ambling, in horſemanſhip, a peculiar kind of pace, wherein a horſe's two legs of the ſame ſide move at the ſame time.

The ambling horſe changes ſides at each remove, two legs of a ſide being in the air, and two on the ground at the ſame time. An amble is uſually the firſt natural pace of young colts, which they quit as ſoon as they have ſtrength enough to trot: there is no ſuch thing as an amble in the manege, the riding-maſter allowing of no other paces beſides walk, trot, and gallop; their reaſon is, that a horſe may be put from a trot to a gallop without ſuch ſtop, which loſes time, and interrupts the juſtneſs and cadence of the manege.

There are various methods and practices of diſcipline for bringing a young horſe to amble. Some chooſe to toil him in his foot pace, through new ploughed fields, which naturally inures him to the ſtroke required in the amble; but this diſorderly toil is very apt to weaken, and ſometimes to lame a young horſe. Others attempt it by ſtopping him in a gallop and trot; ſo that loſing both he neceſſarily ſtumbles on an amble; but this is apt to ſpoil a good mouth and rein, and expoſes the horſe to the danger of an hoof-reach or ſinew-ſtrain, by over-reaching, &c. Others prefer ambling by weights as the beſt way; and to this end ſome over-load their horſe with exceſſive heavy ſhoes, which are apt to make him interfere or ſtrike ſhort with his hind feet. Others fold leaden weights about the fetlock paſterns, which are not only liable to the miſchiefs of the former, but put the horſe in danger of incurable ſtrains, cruſhing of the coronet, and breeding of ring-bones, &c. Others load the horſe with earth, lead, &c. which may occaſion a ſwaying of the back, over-ſtraining of the fillets, &c. Some endeavour to make him amble in hand, before they mount his back, by means of ſome wall, ſmooth pole, or rail, and by checking him in the mouth with the bridle-hand and correcting him with a rod on the hinder hoofs, and under the belly, when he treads falſe; but this is apt to drive a horſe to a deſperate frenzy, before he can be made to underſtand what they would have him do, and to rear, ſprawl out his legs, and make other antic poſtures, which are not eaſily quitted again. Others think to effect it by a pair of hind ſhoes, with long ſpurns or plates before the toes, and of ſuch length, that if the horſe offers to trot, the hind foot beats the fore foot; but this occaſions wounds of the back-ſinews, which often bring on an incurable lameneſs. Some attempt it by folding fine ſoft liſts ſtrait about his gambrels in the place where he is gartered for a ſtifle ſtrain, and turn him thus to graſs for two or three weeks; and afterwards take away the liſt. This is a Spaniſh method, but diſapproved; for though a horſe cannot then trot but with pain, yet the members muſt be ſufferers; and though the amble be gained, it muſt be ſlow and unſightly, becauſe attended with a cringing in the hind parts.

The beſt way is to try with the hand by a gentle and deliberate racking, and thruſting the horſe forwards, by helping him in the weeks of his mouth with your ſnaffle, which muſt be ſmooth, big, and full; and correcting firſt on one ſide, and then on the other, with the calves of your legs, and ſometimes with a ſpur. If you can make him of himſelf to ſtrike into an amble, though ſhuffling and diſorderly, there will be much labour ſaved; for that aptneſs to amble will make him with more eaſe and leſs danger endure the tramel, and find the motion without ſtumbling or amazement; but if you perceive he will by no means either apprehend the motions or intentions, then ſtruggle no longer with him, but apply the tramel immediately. See Tramel. *Newcaſtle's Horſemanſhip.*

AMBLYGONAL, in geometry, an epithet applied to any thing obtuſe angular, as a triangle, one of whoſe angles is obtuſe, or more than 90°, or other plane figure that has one or more obtuſe angles.

The word is formed from the Greek, *αμβλυς* obtuſe, and *γωνια*, an angle.

AMBLYOPY, among phyſicians, ſignifies an obſcuration of the ſight, ſo that objects at a diſtance cannot be clearly diſtinguiſhed.

The word is Greek, *αμβλυωπια*, and compounded of *αμβλος*, dull, and *ωψ*, the eye.

AMBO, or Ambon, among the ancients, was a kind of pulpit, or reading-deſk, where that part of divine ſervice called the gradual was performed.

AMBON, in anatomy, the cartilaginous margin of thoſe ſockets into which the prominent parts of bones are inſerted in ſome ſpecies of articulation.

AMBROSIA, among the ancient pagans, ſignified the ſolid food of the gods, in contradiſtinction to their drink, which was called nectar.

The word is Greek, and compounded of *α*, priv. and *βροτος*, mortal; becauſe they ſuppoſed that whoever eat of it was rendered immortal.

Ambrosia, in botany, the name of a diſtinct genus of plants, with floſculous flowers, divided into five ſegments; but the fruit, which in ſome meaſure reſembles a club, grows on other parts of the plant.

AMBROSIAN *Office*, in eccleſiaſtical hiſtory, a particular office, or form of worſhip, uſed in the church of Milan; and ſo called from its author, Ambroſe, archbiſhop of Milan in the IVth century.

Originally, each church had its particular office; and even when the pope took upon him to impoſe the Roman office on all the Weſtern churches, that of Milan ſheltered itſelf under the name and authority of St. Ambroſe; from which time the Ambroſian ritual has obtained in contradiſtinction to the Roman ritual.

AMBUSCADE, in military affairs, implies a body of men poſted in ſome ſecret or concealed place, till they find an opportunity of falling upon the enemy by ſurprize.

AMBUSTION, in ſurgery, the ſame with what we generally call a burn. See the article Burn.

AMEA, in botany, the name of a plant with large alated leaves, which, being dried and powdered, are uſed by the natives of Guinea for ſtopping bleedings at the noſe.

AMEL, a term frequently uſed by Mr. Boyle for enamel. See Enamel.

AMEN, a ſolemn concluſion to all the prayers of the church; and ſignifies, ſo be it.

The word is Hebrew, and formed from the verb, *aman*, which in the paſſive voice ſignifies to be true, faithful, &c.

There is alſo formed from this noun a kind of affirmative adverb, ſignifying truly, verily; and in this ſenſe it is often uſed in the Goſpels.

The Rabbins are of opinion that the word Amen is formed from the initial letters of *Adonia, Melech Neeman*, the lord, the faithful king; an expreſſion common among the Jews, when they would add a weight or ſanction to what they affirmed.

AMENDMENT, in law, ſignifies the correction of an error committed in a proceſs, which may be amended after judgment, unleſs the error lies in giving judgment; for in that caſe it is not amendable, but the party muſt bring a writ of error

Amendment, in a literary ſenſe, implies the correction of ſome impropriety in the former edition of a book.

AMENTACEOUS, in botany, an epithet applied to ſuch flowers as have an aggregate of ſummits hanging down in the form of a rope or cats-tail.

AMERCEMENT, or Amerciament, in law, a pecuniary puniſhment impoſed on offenders at the mercy of the court.

It differs from a fine in being impoſed arbitrarily in proportion to the fault; whereas a fine is a certain puniſhment ſettled expreſly by ſome ſtatute.

AMERICA, one of the four grand diviſions of the earth. It is a vaſt continent, extending from 80 deg. north latitude, to 58 deg. ſouth; and from 35 deg. to 145 deg. weſt longitude. It is bounded on the weſt by the Atlantic ocean, which ſeparates it from Europe and Africa; and on the weſt by the Pacific ocean, or South-Sea, which divides it from Aſia.

This prodigious tract of land is divided into two peninſulas called North and South America, and connected together by the iſthmus of Darien.

It is at preſent poſſeſſed by different nations of Europe: but Spain has by far the largeſt ſhare; enjoying Old and New Mexico, Terra-Firma, Peru, Chili, Patagonia, and Paraguay; beſides a great number of iſlands, among which are Cuba, Hiſpaniola, Porto Rico, and Trinidad. The Portugueſe are maſters of the extenſive country of Brazil. The Engliſh poſſeſs the provinces of Eaſt and Weſt Florida, Georgia, South and North Carolina, Virginia, Maryland, Penſylvania, the two Jerſies, New York, New England, New Scotland, Canada, New Britain, and Hudſon's-Bay; together with the iſlands of Jamaica, Barbadoes, St. Chriſtophers, &c. Newfoundland, Cape-Breton, and many others. The French claim an extenſive country to the weſtward of the river Miſſiſſippi, and are in poſſeſſion of the iſlands of Caen, Martinico, Guadaloupe, St. Lucia, &c. The Dutch are poſſeſſed of Surinam, and ſome of the iſlands on the north coaſt of Terra Firma. The iſland of St. Thomas belongs to Denmark.

AMETHYST, *Amethyſtus*, in natural hiſtory, a gem, or precious ſtone of a purple colour, ſometimes approaching to violet, and ſometimes fading to a pale roſe-colour.

Sometimes it is found colourleſs, and may at any time be made ſo by expoſing it to the fire; in which pellucid, or colourleſs ſtate, it ſo nearly imitates the diamond, that even jewellers themſelves are often deceived, it wanting nothing but the hardneſs to render it equal to that gem

Boet affirms, that he has ſeen one ſet in a gold ring, which was ſold for two hundred crowns. They are found in India, Arabia, Armenia, Ethiopia, Cyprus, Germany, Bohemia, and Miſnia; but as they are generally as ſoft as cryſtal, they are not in very great eſteem. The oriental are hardeſt; if they are without ſpots, they are of the greateſt value. They are found of various ſizes, and in various ſhapes, from the bigneſs of a ſmall pea, to an inch and a half in diameter. They are adulterated with maſtick, tinged of a violet colour, placed between two cryſtals; but the Germans do not think it worth while to counterfeit them, becauſe they are pretty common.

Amethyst, in heraldry, is a term uſed for a purple colour in the coat of a nobleman.

AMIABLE, or Amicable *Numbers*, in arithmetic, are ſuch as are equal to the ſum of each other's aliquot parts.

Thus the numbers 284 and 220 are amicable numbers; for the aliquot parts 1, 2, 4, 5, 10, 11, 20, 22, 44, 55, 110, of 220, are together equal to the other number 284; and the aliquot parts 1, 2, 4, 71, 142, of 284, are together equal to 220.

Van Schouten is ſuppoſed to be the firſt who gave this name to ſuch numbers; and ſhews at *Sect.* II. *Miſcellan.* at the end of his *Exercitationes Geometr.* how the above pair of amicable numbers may be found by common algebra, by ſuppoſing one of the numbers to be $4x$, and the other $4yz$, and making an equality between them and their ſeveral aliquot parts. Thus, the aliquot parts of $4x$ are $1, 4, x, 2, 2x$; thoſe of $4yz$ are $1, 2, 4, 4y, 4z, 2y, 2yz, yz, z, y, 2z$: the ſum of the former is $7+3x$, and that of the latter equal to $7+3yz+7y+7z$. Hence theſe equations $7+3x=4yz$, and $7+3yz+7y+7z=4x$, conſequently we have, after due reduction, $\frac{49+21y}{7y-21}=z$, or $z=\frac{7+3y}{y-3}$. In this equation the leaſt value that can be aſſumed for y, muſt be 5, otherwiſe z will be negative; therefore, taking $y=5$, z will become 11, and $4zy=220$, whence we get $4x=284$.

If $16x$ and $16yz$ had been aſſumed for the required numbers, inſtead of the former values $4x$ and $4yz$, then by the ſame ſort of proceſs as before, $16yz$ would have been found equal to 17296, and $16x=18416$, the next pair of amicable numbers, whoſe alternate aliquot parts are 1, 2, 4, 8, 16, 1151, 2302, 4604, 9208, and 1, 2, 4, 8, 16, 23, 46, 47, 92, 94, 184, 188, 368, 376, 752, 1081, 2162, 4324, 8648; their total ſums equal to 17296 and 18416 reſpectively.

It is eaſy to apprehend, from the nature of theſe numbers, that there are but a very few of them, at leaſt to be ſet down and manageable by us; for 284 and 220 are the two leaſt; and the two next greater are 18416 and 17296.

AMIANTHUS, in natural hiſtory, vulgarly called earth-flax, is a fibrous, flexile, and mineral ſubſtance, compoſed of ſhort and abrupt filaments.

It is a ſtony concrete, of the talky kind, though differing from a talc in its external appearance. It is not near ſo bright, or ſo ſmooth and unctuous; and compoſed not of leaves or plates, but of long filaments like flax: it has been ſpun into cloth, and formed into paper, incombuſtible and indeſtructible in the fire.

There are ſome ſorts of amianthus whoſe filaments are rigid and brittle, others more flexible: the firſt are not at all to be ſpun or formed into cloth; and the latter with very great difficulty. This manufacture appears to have been known among the ancients, who, according to Pliny, wrapt the corpſe of their dead in amianthine clothes, to preſerve their aſhes ſeparate from thoſe of the funeral pile; an uſe to which they are ſtill ſaid to be applied among the princes of Tartary. The method of preparation, as deſcribed by Ciampini in the Philoſophical Tranſactions, N°. 273, is as follows: The ſtone is laid to ſoak in warm water, then opened and divided by the hands, that the earthy matter may be waſhed out. This earth is white like chalk, and renders the water thick and milky. The ablution being ſeveral times repeated, the flax-like filaments are collected and dried; they are moſt commodiouſly ſpun with an addition of flax: two or three filaments of the amianthus are eaſily twiſted along with the flaxen-thread, if the operator's fingers are kept oiled. The cloth alſo when woven is beſt preſerved by oil from breaking or waſting. On expoſure to the fire, the flax and the oil burn out, and the cloth comes out pure and white. Probably from the diſſipation of ſome extraneous matter of this kind proceeded the diminution of weight which an amianthine napkin ſuffered in the fire, in an experiment made before the Royal Society; for pure amianthus loſes nothing. The ſhorter filaments which ſeparate in waſhing the ſtone, may be made into paper in the common manner.

The proprietor of a forge in ſome part of France, not named, upon taking down his furnaces to repair them, found a great quantity of this ſubſtance at the bottom, which, like the native amianthus, was capable of being manufactured either into incombuſtible linen or paper. Upon a farther enquiry, he diſcovered that both this and the native amianthus is nothing more than calcined iron, deprived of the phlogiſtic, and that uniting the phlogiſtic with this, or the foſſil amianthus, he can reſtore it any time to its primitive ſtate of iron.

AMICITIA, in the feudal cuſtoms, were lands granted to be enjoyed only ſo long as the donor pleaſed.

AMIDSHIPS, amongſt ſeamen, the middle of the ſhip, either with regard to her length or breadth; as, put the helm amidſhips; i. e. at an equal diſtance from both the ſides. She bore down, and her ſtem took us amidſhips, i. e. in or near the middle, between the ſtem and ſtern, or the two ends.

AMIESTIES, a ſpecies of cotton cloths imported from the Eaſt Indies.

AMMI, biſhops weed, in botany, a diſtinct genus of umbelliferous plants, the flower of which is roſaceous, compoſed of heart-like petals; and its fruit a ſmall roundiſh and ſtriated capſule, containing two ſtriated ſeeds, convex on one ſide.

The ſeeds of this plant have been long known in the ſhops as one of the leſſer hot ſeeds, and eſteemed aromatic, aperitive, carminative, and alexipharmic.

AMMOCHRYSOS, in natural hiſtory, the name of a ſtone common in Germany, with gold coloured ſpangles. It is much uſed, after being reduced to powder, to ſtrew over writings.

The word is Greek, and compounded of αμμος, ſand, and χρυσος, gold.

AMMODYTES, the ſand-ſerpent, in natural hiſtory, the name of a ſerpent found in different parts of the world, particularly in the torrid zone, and ſo called from its burying itſelf in the ſand.

The word is Greek, and compounded of αμμος, ſand, and δυω, to bury in, or get under.

This ſerpent greatly reſembles the viper, except in its head and jaws, which are much larger. It is about two feet in length, and of a ſandy colour. On the external part of its upper jaw there is an eminence reſembling a wart, whence it has alſo been called the horned ſerpent.

The ammodytes of Ceylon is a very large and dangerous ſerpent, with a mouth full of ſharp teeth. The eyes are large and ſparkling, and the forehead is covered with ſmall round ſcales, ſome of which are yellow, others red, and ſpecked with black. On one ſide of the eyes are black ſtripes reaching to the neck; but the body, above and below, is of a whitiſh aſh-colour; and on the back are angular ſpots variegated with white and brown. The ſcales that cover the upper part of the body, are placed like net-work, with large meſhes, and the tail is ſpotted with brown, ending in a bony point.

The ammodytes of Surinam is a ſerpent which the negroes have in high eſteem, and they think themſelves very happy if they come into their huts; their colours are ſo many and beautiful, that they ſurpaſs all deſcription.

AMMON, or HAMMON, in mythology, the name of the Egyptian Jupiter, worſhipped under the figure of a ram.

Bacchus, having ſubdued Aſia, and paſſing with his army through the deſarts of Africa, was in great want of water; but Jupiter, his father, aſſuming the ſhape of a ram, led him to a fountain, where he refreſhed himſelf and his army: in requital of which favour, Bacchus built there a temple to Jupiter, under the title of Ammon, from the Greek αμμος, which ſignifies ſand, alluding to the ſandy deſart where it was built.

This is the poetical account; but it is more probable that the Egyptians worſhipped the ſun under this name; for *hammah*, in Hebrew, ſignifies the ſun; or perhaps they meant by it Ham, the ſon of Noah, whoſe poſterity ſettled in Libya.

Cornu AMMONIS, in natural hiſtory; ſee the article CORNU *Ammonis*.

AMMONIACUM, or *Gum* AMMONIACUM, in the materia medica, a concrete gummy-reſinous juice brought from the Eaſt Indies, and generally in large maſſes.

Both the plant which produces ammoniacum, and the place of its production, are unknown. The beſt ammoniacum is compoſed of white, whitiſh, or yellowiſh tears baked into maſſes: the internal parts particularly are whitiſh: by age it becomes more and more yellow and brown. It eaſily ſoftens and becomes tough betwixt the fingers. Chewed, it diſcovers a bitteriſh, glutinous, not diſagreeable, taſte. Its ſmell approaches to that of a mixture of opopanax and galbanum: ſome reſemble it to that of caſtor, others to that of coriander-ſeeds, and others to that of garlic.

It diſſolves almoſt equally in water and ſpirit. Out of an ounce of choice ammoniacum, rectified ſpirit of wine diſſolved ſix drams; water applied to another ounce, took up ſix drams two ſcruples and a half. From the matter left undiſſolved by ſpirit, water took up five ſcruples and five grains; from that which water left undiſſolved, rectified ſpirit extracted a dram; the indiſſoluble part amounting in the firſt caſe to fifteen grains, in the latter only to half a ſcruple. In diſtillation, ſpirit of wine ariſes unchanged; the diſtilled water has ſomewhat of a ſweetiſh taſte, and ſmells a little of the ammoniacum, but gives no appearance of any eſſential oil.

Ammoniacum is accounted deobſtruent; promotes urine; and, in large doſes, opens the belly. It is given particularly in obſtructions of the breaſt, in cachectic, hydropic, and apoplectic caſes, from a ſcruple to half a dram. It operates more effectually in a liquid form, as that of an emulſion, than in the ſolid one of pills; but is moſt commodiouſly taken in the latter form. It is ſometimes diſſolved in vinegar: externally it reſolves hard ſwellings. It is purified by diſſolving it in vinegar, wine, or water, and ſtraining and inſpiſſating the ſolution.

Sal AMMONIACUM. See SAL *Ammoniacum*.

AMMONITÆ, in natural hiſtory, the ſame with cornu Ammonis. See CORNU *Ammonis*.

AMMUNITION, in military affairs, a general name for powder, balls, &c.

AMMUNITION *Bread*, *Shoes*, *&c.* ſuch as are ſerved out to the ſoldiers of an army, garriſon, &c.

AMNESTY, in civil policy, implies an act, whereby two parties at variance mutually promiſe to pardon and bury in oblivion all that is paſt.

But in a more limited ſenſe it ſignifies a pardon granted by a prince to his ſubjects, by which the former promiſes to forget and annul all that is paſt.

The word is formed from the Greek, *αμνηστια*, the name of an edict of this kind publiſhed by Thraſibulus, on his expulſion of the tyrants out of Athens.

AMNIOS, in anatomy, a thin pellucid membrane ſurrounding the fœtus.

It is an interior membrane, contiguous to the exterior one called the chorion, having no veſſels, or at moſt very few; and contains a pellucid glutinous liquor which flows out upon breaking this membrane at the time of delivery.

AMOMUM *Verum*, true amomum, in the materia medica, a cluſter of round fruits, or ſeed veſſels, of an orient plant. Each fruit is about the ſize of a middling grape; and contains, under a membranous cover, a number of ſmall rough angular ſeeds, of a blackiſh brown colour on the outſide, and whitiſh within: the ſeeds are lodged in three diſtinct cells, and thoſe in each cell joined cloſely together; ſo that the fruit, on being opened, appears to contain only three ſeeds. Ten or twelve of theſe capſules ſtand together, without pedicles, upon a woody ſtalk about an inch long; each ſingle capſule is ſurrounded with ſix leaves ſet in form of a ſtar; and the part of the ſtalk, void of fruit, is clothed with leafy ſcales. Of the other parts of the plant, we have no certain account.

The ſeeds of amomum are a ſtrong and grateful aromatic, of a quick penetrating fragrant ſmell, ſomewhat like that of lavender, but more agreeable, and of a very warm pungent taſte, approaching to that of camphor. They are ſaid to yield in diſtillation a large portion of a ſubtile eſſential oil. The huſks have the ſame kind of flavour in a lower degree. Theſe ſeeds have long been a ſtranger to this country. They are directed as an ingredient in the theriaca, in which they have been commonly ſupplied by the ſeeds of the amomum vulgare; and the London college, under the name amomum, have now allowed either the verum or vulgare to be taken indifferently. The college of Edinburgh, while they retained that compoſition, employed as a ſuccedaneum to the amomum, a ſpice more approaching to the nature of cloves.

Amomum *Vulgare*, baſtard ſtone parſley, in the materia medica, an umbelliferous plant; very much branched; with a firm ſtalk higher than the branches; deep green, winged, ſerrated, parſnep-like leaves; upright umbels; and ſmall, narrow, oblong, ſtriated, dark browniſh ſeeds, flat on one ſide and convex on the other. It grows wild under moiſt hedges, and by the ſides of ditches; flowers in June and July, and ripens its ſeeds in Auguſt.

The ſeeds of the amomum vulgare have a light agreeable ſmell, and a mild warm aromatic taſte. They have been ſometimes given as carminatives and diuretics, like the other warm ſeeds, and uſually ſubſtituted in the ſhops for thoſe of the amomum verum, from which, however, they are very conſiderably different in quality, as well as in appearance: they are not near ſo hot or pungent, nor is their flavour of the ſame kind.

Theſe ſeeds, infuſed in water, give out very little of their virtue: by boiling, their flavour is ſoon diſſipated, and the liquor becomes diſagreeably bitteriſh: in diſtillation with water they yield a ſmall portion of a yellowiſh eſſential oil, which taſtes and ſmells ſtrongly and agreeably of the ſeeds.

Rectified ſpirit readily extracts their virtue, and, what is pretty ſingular, gains from them a green tincture: the ſpirit, drawn off by diſtillation from the filtered liquor, brings over with it nothing conſiderable of the flavour of the ſeeds: the remaining extract taſtes ſtrongly and ſmells lightly of the amomum, and proves a moderately warm, bitteriſh, not ungrateful, aromatic.

AMPELITUS, cannel-coal, in natural hiſtory; ſee the article Cannel-Coal.

AMPHIARTHROSIS, in anatomy, a ſpecies of articulation or juncture of the bones, having a manifeſt motion.

The word is Greek, and compounded of *αμφι*, about, and *αρθρωσις*, articulation.

It reſembles the diarthroſis in being moveable, and the ſynarthroſis in its connection. See Diarthrosis, and Synarthrosis.

The pieces which compoſe it have not a particular cartilage belonging to each of them, as in the diarthroſis; but are both united to a common cartilage, which being more or leſs pliable, allows them certain degrees of flexibility, though they cannot ſlide upon each other. By this ſpecies of articulation the bodies of the vertebræ are connected with each other.

AMPHIBIOUS, in natural hiſtory, an epithet applied to ſuch animals as live part of their time on the land, and part in the water.

The word is Greek, *αμφιβιος*, and compounded of *αμφι*, both, and *βιος*, life; as living in two elements.

Linnæus has made a claſs of amphibious animals; the firſt order of which contains the tortoiſe, the frog, the crocodile, the lizard, the ſalamander, the cameleon, the ſcinc, &c. and the ſecond the ſerpents.

AMPHIBLESTROIDES, in anatomy, a name given to one of the tunics or membranes of the eye, generally called the retina. See the article Retina.

The word is Greek, and compounded of *αμφιβληστρον*, a net, and *ειδος*, reſemblance; becauſe the ſtructure of that membrane reſembles a net; and hence the Latins call it *retiformis*.

AMPHIBOLOGY, in grammar, implies the ſame as ambiguity, or that the phraſe is capable of two different interpretations.

The word is Greek, *αμφιβολογια*, and compounded of *αμφι*, about, and *βαλλω*, to throw.

AMPHIBRACHYS, in the Greek and Latin poetry, is the name of a foot conſiſting of three ſyllables, one long and the other two ſhort, the former being in the middle, and the others forming the two extremities.

The word is Greek, and compounded of *αμφι*, about, and *βραχυς*, ſhort.

AMPHICTYONS, in antiquity, the deputies ſent from the different ſtates of Greece to Thermopile, where they met regularly twice a year, in the temple of Ceres, built in a large plain near the river Aſophus. They decided all differences that happened between any of the cities of Greece, and their deciſions were held ſacred and inviolable.

They had their name from Amphictyon III. king of Athens, who firſt eſtabliſhed an aſſembly of Amphictyons, in order to unite the Greeks more firmly together, and render them a terror to the barbarous nations in their neighbourhood.

Acryſius alſo inſtituted a council of Amphictyons on the model of the former; and who met twice a year in the temple of Delphos.

AMPHIDROMIA, a feaſt celebrated by the ancients on the fifth day after the birth of a child.

AMPHIMACER, a foot in ancient Greek and Latin poetry, conſiſting of three ſyllables, of which the firſt and laſt are long, and that in the middle ſhort.

The word is Greek, and compounded of *αμφι*, about, and *μακρος*, long.

AMPHIPOLES, in antiquity, the principal magiſtrates of Syracuſe. They were eſtabliſhed by Timoleon in the 109th Olympiad, after the expulſion of the tyrant Dionyſius. They governed Syracuſe for the ſpace of three hundred years; and Diodorus Siculus aſſures us, that they ſubſiſted in his time.

AMPHIPROSTYLE, in ancient architecture, implied a temple that had four columns in both the fore and hind fronts, which were parallel.

The word is Greek, and compounded of *αμφι*, about, *προ*, before, and *ϛυλος*, a column.

AMPHISBÆNA, in natural hiſtory, a kind of ſerpent, found in hot climates, and ſo called becauſe it moves with either end forward.

The word is Greek, and formed from *αμφι*, about, and *βαινω*, to go.

AMPHISCII, in geography, a name applied to thoſe people who inhabit the torrid zone; becauſe their ſhadows point one part of the year towards the north, and the other towards the ſouth.

The word is Greek, and compounded of *αμφι*, about, and *σκια*, a ſhadow.

AMPHITHEATRE, in antiquity, a ſpacious edifice, of a circular or oval form, with a number of riſing ſeats, on which the people ſat to behold the combats of gladiators, wild beaſts, and other ſports.

The word is Greek, and compounded of *αμφι*, about, anT *θεατρον*, a theatre.

Amphitheatres were originally built of wood; and Statilius Taurus, in the reign of Auguſtus, was the firſt who erected one of ſtone. The loweſt part was called *arena*, from its being generally ſtrewed with ſand, for the conveniency of the combatants; and round the arena were vaults, in which the wild beaſts, appointed for the ſhews, were contained.

Above theſe cells was erected a large circular periſtyle, for accommodating the emperors, ſenators, and other perſons of diſtinction. Over the periſtyle were the rows of benches, which were entered by avenues terminated by gates called vomitoriæ.

Amphitheatre, in gardening, a temple of view, erected on a riſing ground, of a ſemi-circular figure.

They are formed of ever-greens, obſerving always to plant the lower trees in the front, and the taller behind.

They are alſo made of ſlopes on the ſides of hills covered with turf; being formerly conſidered as great ornaments in a garden, but now generally excluded; as the natural ſlope of ſuch hills is much more beautiful than the ſtiff angular ſlopes of theſe amphitheatres.

AMPHITRITE, in mythology, a goddeſs of the ſea, the daughter of Ocean and Doris, and wife of Neptune. She at firſt refuſed the addreſſes of that god, and reſolved to preſerve her virginity; but Neptune ſent a dolphin in ſearch of her, who found her at the foot of Mount Atlas, and perſuaded her to marry the god of the ſea. Two of the Nereides were alſo called by this name.

AMPHITRITE, in natural hiſtory, is the name of a ſmall naked ſea inſect, of an oblong figure, with only one tentaculum reſembling a piece of thread.

AMPHORA, in antiquity, a liquid meaſure in uſe among the Greeks and Romans; that uſed by the latter contained about ſeven gallons one pint Engliſh wine meaſure; but the Grecian amphora contained one third more.

AMPHORA was alſo a dry meaſure uſed by the Romans, and contained about three buſhels.

AMPHORA, among the Venetians, is the largeſt meaſure uſed for liquids, containing about ſixteen quarts.

AMPLIFICATION, in rhetoric; ſee the article EXAGGERATION.

AMPLITUDE, in aſtronomy, is an arch of the horizon, intercepted between the true eaſt or weſt point thereof, and the center of the ſun, or a ſtar, at its riſing or ſetting; the former is called the eaſtern or ortive, and the latter the weſtern or occiduous amplitude.

The eaſtern and weſtern amplitude are alſo called northern and ſouthern, as they fall in the northern and ſouthern quarters of the horizon.

To find the ſun's or a ſtar's amplitude, either riſing or ſetting, by the globe, ſee GLOBE.

To find the amplitude trigonometrically, by having the latitude of the place and declination of the ſun given; let H O (plate X. *fig.* 2.) repreſent the horizon, P the north and S the ſouth pole; Æ Q the equator, Z the zenith, and N the nadir, and the primitive circle H P O S a meridian; then will B be the eaſt or weſt point of the horizon: and if C repreſent the center of the ſun, or of a ſtar, at its riſing, the arch B C will be the amplitude required.

Suppoſe the latitude 50° 30′ N. and the ſun's declination 21° 00′; then in the right angled ſpherical triangle B D C, right angled at D, are given the perpendicular D C = the ſun's declination = 21°, and the angle D B C = the arch O Q, = the comp. lat. = 39° 30′ to find the hypothenuſe B C; which will be found by the following proportion.

As the ſine of the angle D B C = 39°, 30′ - 9,803510
To radius — — — — 90°, 00′ - 10,000000
So is the ſin. of D C, the ſun's dec. = 21°, 00′ - 9,554329

To the ſin. of B C, the amp. req. = 34°, 18′ - 9,750819

Magnetical AMPLITUDE is an arch of the horizon contained between the center of the ſun at his riſing or ſetting, and the eaſt or weſt point of the compaſs. It is found by an amplitude or azimuth compaſs, by obſerving the ſun at his riſing or ſetting, and is always equal to the difference between the true amplitude, and the variation of the compaſs.

AMPLITUDE of the range of a projectile, denotes the horizontal line ſubtending the path in which it moves. See PROJECTILE.

AMPLITUDE *Compaſs*, in navigation, an inſtrument more exactly calculated to obſerve the ſun's magnetical amplitude than the common ſea-compaſs. See the article *Amplitude* COMPASS.

AMPULLA, in antiquity, a round veſſel uſed by the ancients in their baths for containing the oil for anointing their bodies. It alſo ſignified a cup made of glaſs or leather for drinking out of at table.

AMPUTATION, in ſurgery, the operation of cutting off a limb or other part of the body.

Manner of AMPUTATING *a Limb*.—Lay your patient on a table, three feet four inches high, which is much better than a low ſeat, both for ſecuring him ſteady, and giving yourſelf the advantage of operating without ſtooping, which is not only painful but inconvenient in the other ſituation. While one of your aſſiſtants holds the leg, you muſt roll a ſlip of fine rag, half an inch broad, three or four times round it, about four or five inches below the inferior extremity of the patella; this being pinned on is to ſerve as a guide to the knife, which without it, perhaps, would not be directed ſo dextrouſly; the manner of rolling has always been perpendicular to the length of the leg; but having obſerved, that though the amputation at firſt be even, yet afterwards the gaſtrocnemius muſcle, contracting, draws back the inferior part of the ſtump more ſtrongly than the other muſcles can do the reſt of it; I have lately, in order to preſerve the regularity of the cicatrix, allowed for this exceſs of contraction, and made the circular inciſion in ſuch a manner, that the part of the wound which is on the calf of the leg, is farther from the ham than that on the ſhin is from the middle of the patella.

In the mean time, one of your aſſiſtants muſt carry a ſtrong ligature round the thigh, about three or four inches above the patella, which, paſſing through a couple of ſlits in a ſquare piece of leather, he muſt twiſt with a tourniquet, till the artery is ſufficiently compreſſed, to prevent any great effuſion of blood; and, to do it more effectually, he may lay a bolſter of tow or linen under the ligature, upon that part where the artery creeps.

The courſe of the blood being ſtopped, you muſt begin your inciſion juſt below the linen roller, on the under part of the limb, bringing your knife towards you; which, at one ſweep, may cut more than the ſemi-circle: then, beginning your ſecond wound on the upper part, it muſt be continued from the one extremity to the other of the firſt wound, making them but one line. The inciſions muſt be made quite through the membrana adipoſa, as far as the muſcles; then taking off the linen roller, and an aſſiſtant drawing back the ſkin as far as it will go, you make your wound from the edges of it, when drawn back, through the fleſh to the bone, in the ſame manner as you did through the ſkin. Before you ſaw the bones, you muſt cut the ligament between them with the point of your knife; and the aſſiſtant, who holds the leg while it is ſawing, muſt obſerve not to lift it upwards, which would clog the inſtrument.

In amputating below the knee, it is of advantage to ſtand on the inſide of the leg, becauſe the tibia and fibula lie in a poſition to be ſawed at the ſame time, if the inſtrument be applied externally: whereas, if we lay it on the inſide of the leg, the tibia will be divided firſt, and the fibula afterwards; which not only lengthens the operation, but is alſo apt to ſplinter the fibula when it is almoſt ſawed through, unleſs the aſſiſtant be very careful in ſupporting it.

When the leg is taken off, the next regard is to be had to the ſtopping of the blood, which muſt be effectually done before the patient is put to bed, or there will be great danger of bleeding again, when the fever is excited, and the veſſels of the ſtump dilated, both which happen a very little while after the operation. There is no method for this purpoſe ſo ſecure as tying the extremities of the veſſels with a ligature, which, with a crooked needle paſſed twice through the fleſh almoſt round them, will, when the knot is made, neceſſarily incloſe them in the ſtricture; and to diſcover the orifice of a veſſel, your aſſiſtant muſt every time looſen the tourniquet: this is a much better way than uſing the artery forceps, where the veſſels are apt to ſlip away out of the ligature; and as to ſtyptic applications, their want of ſafety is ſo well known now, that the uſe of them, in hæmorrhages from large veſſels, is almoſt univerſally rejected.

It ſometimes happens in a large ſtump, that ten or more veſſels require tying; which done, you muſt apply looſe dry lint to the wound, or, in caſe the ſmall veſſels bleed plentifully, you muſt throw a handful of flour among the lint, which will contribute to the more effectual ſtopping up their orifices. Before you lay on the pledget, you muſt bind the ſtump, and begin to roll from the lower part of the thigh down to the extremity of the ſtump. The uſe of this roller is to keep the ſkin forwards, which, notwithſtanding the ſteps already taken to prevent its falling back, would in ſome meaſure do ſo, unleſs ſuſtained in this manner. The dreſſings may be ſecured by the croſs cloth and gentle bandage; and the method of treating the wound muſt be the ſame as that for other recent and inciſed wounds. See Wound.

Before the invention of making the double inciſion I have juſt now deſcribed, the cure of a ſtump was always a work of time; for by cutting down to the bone at once, and ſawing it directly, the conſequence was, that the ſkin and fleſh withdrew themſelves, and left it protruding out of the wound two or three inches in ſome caſes; ſo that it rarely happened that an exfoliation did not follow; which, beſides being tedious, alſo frequently reduced the wound to an habitual ulcer, and at beſt left a pointed ſtump, with a cicatrix ready to fly open upon the leaſt accident; all which inconveniences are avoided by this new method, and I know not of any objection to it, unleſs that the pain of making the wound is ſuppoſed to be twice as much as in the other, becauſe of the double inciſion; but when we conſider that we only cut the ſkin once, and the fleſh once, though not in the ſame moment, I fancy, upon reflection, the difference of pain will be thought inconſiderable.

In amputating the thigh, the firſt inciſion is to be made a little more than two inches above the middle of the patella; after the operation, a roller ſhould be carried round the body, and down the thigh, to ſupport the ſkin and fleſh. This is alſo the moſt proper bandage, as abſceſſes will ſometimes form in the upper part of the thigh, which cannot diſcharge themſelves ſo conveniently with any other, it being almoſt impracticable to roll about the abſceſs, unleſs you begin from the body.

The amputation of the arm and cubit differs ſo little from the foregoing operations, that it will be but a repetition to deſcribe it. However, it muſt be laid down as a rule, to preſerve as much of the limb as poſſible, and, in all amputations of the upper limbs, to place your patient in a chair.

There are, in armies, a great many inſtances of gunſhot wounds of the arm, near the ſcapula, which require amputation at the ſhoulder: but the apprehenſion of loſing the patients on the ſpot by the hemorrhage, has deterred ſurgeons from undertaking it. I have heard of its having been done once; but, though it had never been performed, we might learn it is practicable from the caſe of a poor miller, whoſe arm and ſcapula were both torn from his body by a rope which was accidentally twiſted round his wriſt, and ſuddenly drawn up by the mill. The poor man recovered in a few weeks. It is remarkable in this accident, that after fainting, the hemorrhage ſtopped of itſelf, and never bled afreſh, though nothing but lint and turpentine were laid on the great veſſels. In caſe, therefore, of a wound or fracture near the joint, or incurable fiſtulas in the joint, not attended with much caries, I think the operation may be performed ſafely in this manner: The patient's arm being held horizontal, make an inciſion through the membrana adipoſa, from the upper part of the ſhoulder, acroſs the pectoral muſcle down to the arm-pit; then, turning the knife with its edge upwards, divide that muſcle, and part of the deltoid; all which may be done without danger of wounding the great veſſels, which will become expoſed by theſe openings; if they be not, cut ſtill more of the deltoid muſcle, and carry the arm backward; then with a ſtrong ligature having tied the artery and vein, purſue the circular inciſion through the joint, and carefully divide the veſſels at a conſiderable diſtance below the ligature; the other ſmall veſſels are to be ſtopped as in other caſes.

In performing this operation, regard ſhould be had to the ſaving as much ſkin as poſſible, and to the ſituation of the proceſſus acromion, which projecting conſiderably beyond the joint, an unwary operator would be apt to cut upon it.

The amputation of the fingers and toes is better performed in their articulation, than by any of the other methods: for this purpoſe a ſtraight knife muſt be uſed, and the inciſion of the ſkin be made not exactly upon the joint, but a little towards the extremity of the fingers, that more of it may be preſerved for the eaſier healing afterwards; it will alſo facilitate the ſeparation in the joint, when you cut the finger from the metacarpal bone, to make two ſmall longitudinal inciſions on each ſide of it firſt. In theſe amputations there is generally a veſſel or two that require tying, and which often prove troubleſome when the ligature is omitted.

It may happen that the bones of the toes, and part only of the metatarſal bones, are carious, in which caſe the leg need not be cut off, but only ſo much of the foot as is diſordered; a ſmall ſpring-ſaw is better to divide with here than a large one. When this operation is performed, the heel and remainder of the foot will be of great ſervice, and the wound heal up ſafely, as I have once found by experience. *Sharp's Surgery.*

AMSDORFIANS, in eccleſiaſtical hiſtory, a ſect of proteſtants who appeared in the ſixteenth century, and acquired the name from one Amſdorf their leader.

They maintained that good works were ſo far from being profitable, that they were even pernicious, and obſtacles in the road to ſalvation.

AMULET, a charm or preſervative againſt miſchief, witchcraft, and diſeaſes.

The word is Latin, *amuletum*, which ſignifies the ſame thing.

The ancients of all nations were extremely fond of amulets; but the preſent philoſophy has pretty well baniſhed theſe and other impoſitions of the ſame kind from the world.

AMYDALES, in anatomy; ſee the article Tonsils.

AMYGDALUS, the almond-tree. See Almond-Tree.

ANA, among phyſicians, denotes an equal quantity of the ingredients that immediately precede it in preſcription.

ANABAPTISTS, in eccleſiaſtical hiſtory, a ſect of proteſtants that ſprung up in Germany about the year 1521, immediately after the reformation of Luther. They at firſt preached up an entire freedom from all ſubjection to the civil power; but their principal tenet, and that from whence they take their name, conſiſts in re-baptizing all converts to their ſect, and condemning infant-baptiſm.

The word is formed from the Greek, *ανα*, again, and *βαπτιζω*, to baptize.

The fanaticiſm of this ſect roſe to an amazing height, and many places ſuffered ſeverely, particularly the town of Munſter, which they ſeized; and one John of Leyden, the king of this New Jeruſalem, defended himſelf in it as long as poſſible; but the place was at length taken, and that ringleader of the anabaptiſts put to death in the year 1536. The anabaptiſts of Frieſland and Holland condemned the ſeditious behaviour of their brethren at Munſter; though they themſelves raiſed ſeveral commotions under the conduct of one Mennon. They were, however, ſome time after pretty well cured of their principal errors; ſo that they no longer pretended to inſpiration; no longer oppoſed magiſtrates; nor preached up a freedom from all ſubjections, a community of goods, and the like.

They ſupported their principal tenet from the following words of our Saviour, "He that believeth, and is "baptized, ſhall be ſaved." Now as adults alone are capable of believing, they argued, that adults only were fit to be baptized. Calvin, and other writers againſt them, had recourſe to the practice of the primitive church, which is clearly on the ſide of infant baptiſm. But ſome drew an argument againſt them from the Scripture, which tells us that children are capable of the kingdom of heaven, and at the ſame time aſſures us, that except a man be baptized he cannot enter into the kingdom of God: ſince therefore, ſay they, children are capable of entering into the kingdom of God, they are alſo qualified for being baptized.

It will be neceſſary to add, that the anabaptiſts of England are not included in the above deſcription; for, except their rejecting infant baptiſm, they differ very little from the other proteſtant diſſenters, as may be ſeen in a Confeſſion of Faith, publiſhed in the year 1689, by the repreſentatives of their congregation.

ANABASII, in antiquity, were couriers who were ſent on horſeback, or in chariots, with diſpatches of importance.

The word is Greek, and derived from αναβαινω, to mount.

ANABIBAZON, in aſtronomy; the Arabic name for the Dragon's tail, or ſouthern node of the moon. See Node.

ANACALYPTERIA, in antiquity, were feſtivals obſerved among the Greeks on the day when the bride was permitted to lay aſide her veil, and appear in public.

The word is Greek, and derived from ανακαλυπτω, to uncover.

ANACAMPSEROS, *Orpine*, *Live-ever*, or *Roſe-root*, in botany, the name of a plant, whoſe root conſiſts of ſeveral white fleſhy tubercles. Its ſtalks are ſolid, upright and round, divided into a few branches, about a foot and a half in height, on which are many fleſhy, thick, juicy leaves, like purſlain or houſe-leek, of a bluiſh green colour with a reddiſh caſt. The flowers are roſaceous, placed on the top of the ſtalks in umbels, and of a reddiſh colour, with five petals, and ſeveral ſmall ſtamina. A piſtil ariſes from the flower-cup, which turns into a fruit, conſiſting of five capſulæ, collecting as it were into a head, which are full of hard ſeeds.

Orpine is now never given inwardly, and but ſeldom employed outwardly, though it is ſaid to heal freſh wounds, and cleanſe ulcers. The juice is, however, commanded by Hoffman againſt ulcers of the womb.

ANACAMPTIC, an epithet applied to ſounds produced by reflection, and particularly to echos. See Echo.

The word is Greek, and compounded of ανα, again, and καμπτω, to turn.

They alſo, by analogy, apply the term anacamptic to that part of optics which relates to reflection, now called catoptrics. See Catoptrics.

ANACARDIUM, the name of two ſpecies of trees, diſtinguiſhed by the epithets *occidentale* and *orientale*. They are both of the claſs of the *Pruniferæ* of Mr. Ray.

Anacardium *Occidentale* is the fruit of the acajou or caſhew-nut tree. See the article Acajou.

Anacardium *Orientale* is the fruit of a large tree found only in the Eaſt Indies. The fruit, or nut, commonly called the Malacca bean, is of a moderately large ſize, of a ſhining black colour, in the ſhape of a heart flattened, of a very thick pedicle, occupying almoſt the whole baſe. The kernel is covered by two tough rinds, between which is lodged a fungous ſubſtance, containing in its cells an extremely acrid matter in a liquid form, while the nut is freſh, but grows dry by long keeping. It is uſed in the ſame intentions with the acajou. See Acajou.

ANACATHARSIS, among phyſicians, implies a diſcharge of noxious humours, either by vomit or by ſpitting.

The word is Greek, and derived from ανακαθαιρομαι, to purge upwards.

ANACATHARTICS, medicines that promote an anacatharſis.

ANACEPHALÆOSIS, in rhetoric, a recapitulation of the heads of a diſcourſe. See Recapitulation.

The word is Greek, and compounded of ανα, again, and κεφαλη, a head or chief point.

ANACHORETS, or Anchorets, in eccleſiaſtical hiſtory, a ſort of monks in the primitive Chriſtian church; ſo called from their retiring from ſociety, and living in private cells in the wilderneſs. Such were Paul and Anthony, and Hilarion, the firſt founders of the monaſtic life in Egypt and Paleſtine. Some of them lived in caves, as St. Chryſoſtom tells us the monks of Mount Caſius, near Antioch, did; and others in little tents or cells. When many of theſe were placed together in the ſame wilderneſs, at ſome diſtance from one another, they were all called by one common name, Laura, which, as Evagrius informs us, differed from a cænobium, or community, in this, that a laura conſiſted of many cells, divided from each other, where every monk provided for himſelf; but a cænobium was but one habitation, where the monks lived in ſociety, and had all things in common.

The word is formed from the Greek, αναχωρεω, to retire into a ſolitary region.

ANACHRONISM, an error in chronology, whereby an event is placed more early than it really happened; but it is often uſed to imply any chronological miſtake.

The word is formed from the Greek, ανα, before, and χρονος, time.

ANACLASTICS, that part of optics which conſiders the refraction of light, and commonly called dioptrics. See Dioptrics.

The word is formed from the Greek, ανα, again, or backward, and κλαζω, to break.

ANACLETERIA, a ſolemn feaſt, celebrated by the ancients on the day their kings or princes came of age, and aſſumed the reins of government; on which occaſion they made a ſolemn declaration to their people.

The word is formed from the Greek, ανα, and καλεω, to appeal.

ANACREONTIC *Verſe*, in ancient poetry, a kind of verſe ſo called from its being greatly uſed, if not invented, by the poet Anacreon. It conſiſts of three feet and a half, uſually ſpondees and iambuſes, and ſometimes of anapeſts. The following verſe of Horace is of this kind:

Lydia dic per omnes.

ANADIPLOSIS, in rhetoric and poetry, implies a repetition of the laſt word of a line, or cloſe of a ſentence, in the beginning of the next. As the following verſes of Virgil:

Sit Tityrus, Orpheus;
Orpheus in ſylvis, &c.

The word is Greek, and compounded of ανα, and διπλοω, to double, or repeat.

Anadiplosis, among phyſicians, implies the return of the cold fit in a ſemi-tertian ague, before the fit is entirely ended.

ANADROMOUS, an epithet applied, by naturaliſts, to ſuch fiſh as go at ſtated ſeaſons from the freſh water into the ſea, and afterwards return again to the rivers.

The word is formed from the Greek, αναδρομη, returning back.

ANAGALLIS, *Pimpernel*, in botany, the name of two ſpecies of plants reſembling chickweed, and diſtinguiſhed by the epithets *mas* and *fœmina*.

Anagallis *Mas*, male pimpernel, has a white ſingle root, with a few fibres. Its ſtalks are ſo weak that they lie on the ground, about nine inches in length, ſquare and ſmooth, and the leaves placed by pairs, and ſometimes three at a time oppoſite to each other; but they have no pedicles. The lower ſurface is ſpotted with blackiſh red ſpots; and the flower conſiſts of one leaf, divided into five ſharp ſegments, of a purpliſh red colour, with purple ſtamina, on which are yellow heads. The flower-cup is alſo divided into five parts, from which a piſtil ariſes fixed in the middle of the flower like a nail, and finally becomes a fruit, or globous ſhell, incloſing many angulous wrinkled ſeeds. This is one of the ſleeping plants, or thoſe whoſe flowers open about eight o'clock in the morning, and cloſe again ſoon after noon.

Anagallis *Fœmina*, female pimpernel, differs only from the former in the colour of the flower, which is blue, and in being more ſcarce than the former, which is common in our corn-fields. The male pimpernel is uſed as a ſallad and a pot-herb in many parts of England; though it is by ſome recommended as an excellent medicine againſt madneſs and the epilepſy, provided four ounces of the juice be given thrice a day; but it is not now depended upon for any ſuch purpoſe.

ANAGOGY, among eccleſiaſtical writers, implies the elevation of the ſoul to things celeſtial and eternal.

The word is Greek, αναγωγη, and compounded of ανα, upward, and αγωγη, from αγω, to draw.

ANAGRAM, a tranſpoſition of the letters of ſome name, whereby a new word is formed from the ſame letters, either to the advantage or diſadvantage of the perſon or thing to which the name belongs.

The word is formed from the Greek, ανα, and γραμμα, a letter.

ANAGRAMMATIST, a compoſer of anagrams.

ANAGORIS, in botany; ſee the article Bean-trefoil.

ANAITIS, in mythology, a pagan goddeſs particularly worſhipped by the Armenians. The greateſt men in the country dedicated their daughters to her ſervice, who thought it an honour to proſtitute themſelves to all thoſe who came to ſacrifice to this falſe deity; after which they were eagerly courted in marriage, as being thought to have acquired an extraordinary ſanctity thereby. Upon the feſtival of this idol, the men and women met in crouds together, and intoxicated themſelves with wine. The reaſon of the inſtitution of the feſtival was this: Cyrus having undertaken an expedition againſt the Sacæ, and being beaten, fled with his army; but afterwards encamping in the place where he had left his baggage, he refreſhed his army, and then counterfeited a flight. The Sacæ, purſuing him, and finding the enemy's camp deſerted, but repleniſhed with wine and proviſions, eat and drank till they had quite intoxicated themſelves. Cyrus returning, ſlew them all, and conſecrated that day to the goddeſs.

ANALECTA, in matters of literature, implies a collection of ſmall pieces of compoſitions, as eſſays, remarks, &c.

The word is Greek, and derived from *αναλεγω*, to collect or gather together.

ANALEMMA, a very ancient aſtronomical inſtrument, as appears by its having been treated of by Ptolemy himſelf, in a peculiar work, which was afterwards publiſhed with a commentary upon it by Frederic Commadine. The conſtruction of this inſtrument, which conſiſts of an orthographic projection of the ſphere upon the plane of the meridian, together with a moveable horizon and index, may be ſeen in ſeveral authors, as in Agulonius's and Taquit's Optics, Witty on the Sphere, Deſcheles Mundi Mathem. &c.

Its uſe is for finding the time of the ſun's riſing and ſetting, the length of the longeſt day in any latitude, and the hour of the day.

The analemma is alſo of uſe among dialliſts, for delineating the various ſorts of furniture upon ſolar dials. See PROJECTION of the ſphere, and DIALLING.

ANALEPSIS, in the healing art, implies the augmentation or nutrition of an emaciated body.

The word is Greek, and derived from *αναλαμβανω*, to repair.

ANALEPTICS, in pharmacy, ſuch medicines as are proper for nouriſhing the body when weakened.

ANALOGICAL, ſomething belonging to, or partaking of the nature of analogy. Thus an analogical ſyllogiſm is that which is founded on the analogy between the premiſes.

ANALOGY, a certain relation ſubſiſting between two or more things, which in other reſpects are entirely different.

The word is Greek, *αναλογια*, and compounded of *ανα* and *λογος*, ratio, or reaſon.

ANALOGY, among mathematicians, ſignifies proportion, or a ſimilitude of ratios. See the articles PROPORTION and RATIO.

ANALOGY, in grammar, is the correſpondence which a word or phraſe has to the genius and received forms of a language.

ANALYSIS, in a general ſenſe, implies the reſolution of ſomething compounded into its original and conſtituent parts.

The word is Greek, and derived from *αναλυω*, to reſolve.

ANALYSIS, in mathematics, is properly the method of reſolving problems by means of algebraical equations, whence we often find that theſe two words *analyſis* and *algebra* are uſed as ſynonymous.

Analyſis, under its preſent improvements, muſt be allowed the apex or height of all human learning; it is this method which furniſhes us with the moſt perfect examples of the art of reaſoning, gives the mind an uncommon readineſs at deducing and diſcovering, from a few data, things unknown; and by uſing ſigns for ideas, preſents things to the imagination, which otherwiſe ſeemed out of its ſphere: by this, geometrical demonſtrations may be greatly abridged, and a long ſeries of argumentations, wherein the mind cannot without the utmoſt effort and attention diſcover the connection of ideas, are hereby converted into ſenſible ſigns, and the ſeveral operations required therein, effected by the combination of thoſe ſigns. But, what is more extraordinary, by means of this art, a number of truths are frequently expreſſed by a ſingle line, which in the common way of explaining and demonſtrating things would fill whole volumes. Thus, by mere contemplation of one ſingle line, whole ſciences may ſometimes be learnt in a few minutes time, which otherwiſe could ſcarce be attained in many years.

ANALYSIS is divided, with regard to its object, into that of *finites*, and *infinites*.

ANALYSIS *of finite Quantities*, is what we otherwiſe call ſpecious arithmetic or algebra. See ALGEBRA.

ANALYSIS *of Infinites*, called alſo the *New* ANALYSIS, is particularly uſed for the method of fluxions, or the differential calculus. See FLUXIONS.

ANALYSIS, in logic, ſignifies the method of tracing things backwards to their ſource, and of reſolving knowledge into its original principles.

This is alſo called the method of reſolution, and ſtands oppoſed to the ſynthetic method, or that of compoſition.

The art of logical analyſis conſiſts principally in combining our perceptions, claſſing them together with addreſs, and contriving proper expreſſions for conveying our thoughts and repreſenting their ſeveral diviſions, claſſes, and relations.

ANALYSIS, in rhetoric, denotes the ſtripping a diſcourſe of all its gaudy dreſs of tropes and figures; or, ſhewing what uſe the orator has made of theſe decorations, in order to embelliſh and ſet off every part of his oration to the beſt advantage.

ANALYSIS, in chemiſtry, implies the decompoſing mixed bodies, or ſeparating their component principles, in order to obtain each of them unmixed with the other.

The method moſt commonly uſed in the decompoſition of bodies, is by applying to them ſucceſſive degrees of heat, from the gentleſt to the moſt violent, in appropriated veſſels, ſo contrived as to collect what exhales from them. By this means the principles are gradually ſeparated from each other; the moſt volatile riſe firſt, and the reſt follow in order, as they come to be acted on by the proper degree of heat: and this is called diſtillation.

But it being obſerved that fire, applied to the decompoſition of bodies, moſt commonly alters their ſecondary principles very ſenſibly, by combining them in a different manner with each other, or even partly decompoſing them, and reducing them to their primitive principles; other means have been uſed to ſeparate thoſe principles without the help of fire.

With this view the mixts to be decompoſited are forcibly compreſſed, in order to ſqueeze out of them all ſuch parts of their ſubſtance as they will by this means part with; or elſe thoſe mixts are for a long time triturated, either along with water, which carries off all their ſaline and ſaponaceous contents, or with ſolvents, ſuch as ardent ſpirits, capable of taking up every thing in them that is of an oily or reſinous nature.

ANALYSIS *of Vegetable Subſtances.*—The principles already mentioned are the only ones that can be obtained from any plant without the help of fire; but by the aſſiſtance of that medium we are enabled to analyſe it more completely in the following manner.

A plant being expoſed to a very gentle heat in a diſtilling veſſel, ſet in balneum mariæ, yields a water which retains its perfect ſmell. This water is, by ſome chemiſts, and particularly the illuſtrious Boerhaave, called the ſpiritus rector. The nature of this odoriferous part of plants is not yet thoroughly known; becauſe it is ſo very volatile, that it is difficult to ſubject it to the experiments neceſſary for diſcovering its properties.

If, inſtead of diſtilling the plant in balneum mariæ, it be diſtilled over a naked fire, with the precaution of putting a quantity of water into the diſtilling veſſel along with it, to prevent its ſuffering a greater heat than that of boiling water, all the eſſential oil contained in that plant will riſe together with the above water: and as no eſſential oil can be extracted after the ſpiritus rector has been drawn off, there is reaſon to think that the volatility of theſe oils is owing to that ſpirit.

The heat of boiling water is alſo ſufficient to ſeparate from vegetable bodies the fat oils they contain; but this muſt be done by decoction only, not by diſtillation; becauſe, though theſe oils will ſwim on water, yet they will not riſe in vapours without a greater degree of heat.

When the eſſential oil is come over, if the plant be expoſed to a naked fire without the addition of water, and the heat be increaſed a little, a phlegm will riſe that gradually grows acid; after which, if the heat be increaſed as occaſion requires, there will come over a thicker and heavier oil; from ſome a volatile alkali, and laſt of all, a very thick, black, empyreumatic oil.

When nothing more riſes with the ſtrongeſt degree of heat, there remains of the plant a mere coal only, called the caput mortuum, or terra damnata. This coal, when burnt, falls into aſhes, which, being lixiviated with water, give a fixed alkali.

It is obſervable that in the diſtillation of plants, which yield an acid and a volatile alkali, theſe two ſalts are often found quite diſtinct and ſeparate in the ſame receiver; which ſeems very extraordinary, conſidering that they are naturally diſpoſed to unite, and have a great affinity with one another. The reaſon of this phenomenon is, that they are both combined with much oil, which embarraſſes them ſo that they cannot unite to form a neutral ſalt, as they would not fail to do were it not for that impediment.

All vegetables, except ſuch as yield a great deal of volatile alkali, being burnt in an open fire, and ſo as to flame, leave in their aſhes a large quantity of an acrid, cauſtic, fixed alkali. But if care be taken to ſmother them, ſo as to prevent their flaming while they burn, by covering them with ſomething that may continually beat down again what exhales, the ſalt obtained from their aſhes will be much leſs acrid and cauſtic; the cauſe whereof is, that ſome part of the acid and oil of the plant being detained in the burning, and ſtopped from being diſſipated by the fire, combines with its alkali. Theſe ſalts cryſtallize, and being much milder than the common fixed alkalies, may be uſed in medicine, and taken internally. They are called Tachenius's ſalts, becauſe invented by that chymiſt.

ANALYSIS *of Animal Subſtances.* — Succulent animal ſubſtances, ſuch as new-killed fleſh, yield by expreſſion a juice or liquid, which is no other than the phlegm, replete with all the principles of the animal body, except the earth, of which it contains but little. The hard or dry parts, ſuch as the horns, bones, &c. yield a ſimilar juice, by boiling them in water. Theſe juices become thick, like a glue or jelly, when their watery parts are evaporated; and in this ſtate they are true extracts of animal matters. Theſe juices afford no cryſtals of eſſential ſalt, like thoſe obtained from vegetables, and ſhew no ſign either of an acid or an alkali.

Great part of the oil which is in the fleſh of animals may be eaſily ſeparated without the help of fire; for it lies in a manner by itſelf: it is commonly in a concrete form, and is called fat. This oil ſomewhat reſembles the fat oils of vegetables; for like them it is mild, unctuous, indiſſoluble in ſpirit of wine, and is ſubtilized and attenuated by the action of fire. But there is not in animals, as in vegetables, any light, eſſential oil, which riſes with the heat of boiling water; ſo that, properly ſpeaking, animals contain but one ſort of oil.

Few animal ſubſtances yield a perceptible acid. Ants and bees are almoſt the only ones from which any can be obtained; and, indeed, the quantity which they yield is very ſmall, as the acid itſelf is extremely weak.

The reaſon is, that as animals do not draw their nouriſhment immediately from the earth, but feed wholly either on vegetables or on the fleſh of other animals, the mineral acids, which have already undergone a great change, by the union contracted between them and the oily matters of the vegetable kingdom, enter into a cloſer union and combination with theſe oily parts, while they are paſſing through the organs and ſtrainers of animals, whereby their properties are deſtroyed, or at leaſt ſo impaired that they are no longer ſenſible.

Animal matters yield in diſtillation, firſt a phlegm, and then, on encreaſing the fire, a pretty clear oil, which gradually becomes thicker, blacker, more fetid, and empyreumatic. It is accompanied with a great deal of volatile alkali; and, if the fire be raiſed and kept up till nothing more comes over, there will remain in the diſtilling veſſel a coal, like that of vegetables, except, that when it is reduced to aſhes, no fixed alkali, or at leaſt very little, can be obtained from them, as from the aſhes of vegetables. This ariſes from hence that, as we ſaid before, the ſaline principle in animals being more intimately united with the oil than it is in plants, and being conſequently more attenuated and ſubtilized, is too volatile to enter into the combination of a fixed alkali; on the contrary, it is more diſpoſed to join in forming a volatile alkali, which on this occaſion does not riſe till after the oil, and therefore muſt certainly be the production of the fire. It muſt be obſerved, that all we have hitherto ſaid concerning the analyſis of bodies muſt be underſtood of ſuch matters only as have not undergone any ſort of fermentation.

ANALYSIS *of Mineral Subſtances.* — Minerals differ greatly from vegetables, and from animals; they are not near ſo complex as thoſe organized bodies, and their principles are much more ſimple: whence it follows, that theſe principles are much more cloſely connected, and that they cannot be ſeparated without the help of fire, which, not having on their parts the ſame action and the ſame power as on organized bodies, hath not the ſame ill effect on them.

Theſe bodies are compound maſſes or combinations of ſeveral bodies; that is, metallic ſubſtances as they are found in the bowels of the earth, united with ſeveral ſorts of ſand, ſtones, earth, ſemi-metals, ſulphur, &c. When the metallic matter is combined with other matters, in ſuch a proportion to the reſt that it may be ſeparated from them with advantage and profit, theſe compounds are called ores; when the caſe is otherwiſe, they are called pyrites and marcaſites; eſpecially if ſulphur or arſenic be predominant therein, which often happens. See the articles ORES and ASSAYING.

ANALYSIS, among grammarians, ſignifies the explaining the etymology, conſtruction, and other properties of words.

ANALYSIS is alſo uſed to imply a brief but methodical illuſtration of the principles of a ſcience; in which ſenſe it ſignifies the ſame with ſynopſis.

ANALYSIS likewiſe denotes a table of the principal heads of a continued diſcourſe, diſpoſed in their proper order.

ANALYST, a perſon who uſes the analytic, or algebraical method of reſolving problems.

ANALYTIC, or ANALYTICAL, ſomething that belongs to, or partakes of, the nature of analyſis.

Thus we ſay, an analytical demonſtration, analytical proceſs, analytical table or ſcheme, analytical method of inveſtigation, &c.

The analytic method ſtands oppoſed to the ſynthetic. In natural philoſophy, as in mathematics, the inveſtigation of difficult things by the analytic method ought to precede the method of compoſition. This analyſis conſiſts in making experiments and obſervations, and in drawing general concluſions therefrom by induction; and admitting of no objections againſt the concluſions, but ſuch as are drawn from experiments, and other certain truths: and though the reaſoning from experiments and obſervations by induction be no demonſtration of general concluſions, yet it is the beſt method of reaſoning which the nature of things admits of; and may be eſteemed ſo much the ſtronger, as the induction is more general: and, if no exception occur from phœnomena, the concluſion may be pronounced general. By this way of analyſis, we may proceed from compounds to their ingredients; from motions to the forces producing them; and in general from effects to their cauſes, and from particular cauſes to more general ones, until we arrive at thoſe which are the moſt general. This is the analytic method, according to the illuſtrious Newton.

The ſynthetic method conſiſts in aſſuming the cauſes diſcovered and received as principles, and by them explaining the phœnomena proceeding from them, and proving the explanations. See SYNTHESIS.

ANALYTICS, *Analytica*, the ſcience and uſe of analyſis. The great advantage of the modern mathematics above the ancient is in point of analytics.

Pappus in the preface to his ſeventh book of Mathematical Collections, enumerates the authors on the ancient analytics, being Euclid, in his *Data* and *Periſmata*; Apollonius, *de Sectione Rationis*, and in his *Conics*; Ariſtœus, *de Locis Solidis*; and Eratoſthenes, *de Mediis Proportionalibus*. But the ancient analytics were very different from the modern.

To the modern analytics principally belongs algebra, an hiſtorical account of which, with the ſeveral authors thereon, ſee under the article ALGEBRA.

The chief writers upon the analyſis of infinites are its inventor, Sir Iſaac Newton, in his *Analyſis per Quantitatum Series, Fluxiones et Differentias, cum enumeratione linearum tertii ordinis*; and in his excellent treatiſe *de Quadratura Curvarum*: Leibnitz, in his *Acta Eruditorum*, an. 1684. The marquis de l'Hoſpital, in his *Analyſe des infiniment petites*, 1696. Carre, in his *Methode pour la meſure des ſurfaces, la dimenſion des Solides, &c. par l'application du calcul integral*, 1700. G. Manfredi, *de conſtructione Equationum differentialium, primi gradus*, 1707. Nic. Mercator, in *Logarithmotechnia*, 1668. Cheyne, in *Methodus Fluxionum inverſa*, 1703. Craig, in *Methodus figurarum lineis rectis et curvis comprehenſarum Quadraturas determinandi*, 1685; and *De Quadraturis figurarum curvilinearum et locis, &c.* 1693. David Gregory, in *Exercitatio Geometrica de dimenſione figurarum*, 1684; and Nieuwentiit, in *Conſiderationes circa Analyſeos ad quantitates infinitè parvas applicatæ, principia*, 1695. To theſe we may add the works of thoſe celebrated authors, Cotes, Maclaurin, Robins and Simpſon.

ANAMELECH, an idol of the Sepharvaites, who are ſaid in Scripture, to have burned their children in honour of Adrammelech and Anamelech.

Theſe idols probably ſignified the ſun and moon. Some of the rabbins repreſent Anamelech under the figure of a mule; others under that of a quail or pheaſant.

ANAMNESTICS, among the profeſſors of the healing art, imply the ſigns by which the preſent ſtate of the body is indicated, in contradiſtinction to prognoſtics.

The word is Greek, and derived from *αναμιμνησκω*, to remember.

ANAMORPHOSIS, in perſpective painting, a monſtrous projection or repreſentation of an image on a plane or curve ſurface, which, beheld at a proper diſtance, ſhall appear regular and in proportion.

The word is Greek, and derived from *αναμορφοω*, to reform, or bring into a new ſhape.

To delineate an anamorphoſis upon a plane. — Draw the ſquare A B C D, (plate VII. *fig.* 4.) of a bigneſs at pleaſure, and ſubdivide it into a number of little ſquares. In this ſquare, called the craticular prototype, let the image to be repreſented deformed, be drawn; then draw the line *a b* (*fig.* 5.) equal to A B, and divide it into the ſame number of equal parts as the ſide of the prototype A B; erect the perpendicular E V in the middle of *a b*, ſo much the longer as the deformity of the image is to be greater. Draw V S perpendicular to E V, ſo much the ſhorter, as you would have the image appear more deformed. From each point of diviſion draw ſtraight lines to V, and join the points *a* and S, by the right line *a* S. Through the points *d e f g*, draw right lines parallel to *a b*, then will *a b c d* be the ſpace in which the monſtrous projection is to be delineated; this ſpace is called the craticular ectype. Laſtly, in every areola, or ſmall trapezium, of the ſpace *a b c d*, draw what appears delineated in the correſpondent areola of the ſquare A B C D; and thus you will obtain a deformed image, which will appear in juſt proportion to an eye diſtant from it the length F V, and raiſed above its height V S.

An image may be deformed mechanically, if you place it, having little holes made here and there in it with a needle, againſt a candle, and obſerve where the rays going through theſe holes, fall on a plane or curve ſurface; for they will give the correſponding points of the image to be deformed.

ANANAS, the pine-apple, in botany, a genus of plants, whoſe flower conſiſts of one funnel-ſhaped leaf, divided into three parts, which afterwards become a fleſhy fruit, full of juice; the ſeeds of which are very ſmall, and almoſt kidney-ſhaped.

Tournefort has enumerated three, and Mr. Miller ſix, ſpecies of this plant.

The pine-apple, ſo called from its reſembling the cones of the European pine-tree, is a native of the torrid zone; but has for ſome years been cultivated here in tolerable perfection. The plant that produces it nearly reſembles the aloe, except that the leaves of the pine-apple are much thinner, longer, and moſt of them near the ground ſtand in a horizontal poſition; but as they approach nearer the fruit, diminiſh in length, and become leſs expanded. The plant, in its native climate, ſeldom grows to above three feet in height, and terminates in a flower reſembling a lily, but of ſo elegant a crimſon as to dazzle the eye. The pine-apple makes its firſt appearance in the center of the flower, about the ſize of a nut; and as this increaſes, the luſtre of the flower fades, and the leaves expand themſelves to make room for it, and ſerve it at once for a baſe and ornament. On the top of the apple itſelf is a crown or tuft of leaves, like thoſe of the plant, and of a very lively blue-green colour. This crown grows in proportion with the fruit, till both have attained their utmoſt magnitude. As ſoon as this happens the fruit begins to ripen, and its green changes into a bright ſtraw-colour; during this alteration of colour, the fruit exhales ſuch a fragrancy as to diſcover it, tho' concealed from ſight. While it continues to grow, it ſhoots out on all ſides, little thorns or prickles, which, as it approaches towards maturity, dry and ſoften, ſo that the fruit is gathered without the leaſt inconvenience.

The ſingularities that concenter in this product of nature cannot fail of ſtriking a contemplative mind with admiration. The crown, which formed a kind of apex, while growing, becomes itſelf a new plant; and the ſtem, after the fruit is cut, dies away, as if ſatisfied with having anſwered the intention of nature in ſuch a production; but the roots ſhoot forth freſh ſtalks, or ſuckers, for the farther increaſe of ſo valuable a ſpecies.

Theſe plants are propagated by planting the crowns which grow on the fruit, or the ſuckers, which are produced either from the plants, or under the fruit, either of which I have found to be equally good, although, by ſome perſons, the crown is thought preferable to the ſuckers, as ſuppoſing it will produce fruit ſooner than the ſuckers, which is certainly a miſtake; for by conſtant experience I find the ſuckers (if equally ſtrong) will fruit as ſoon, and produce as large fruit as the crowns.

The ſuckers and crowns muſt be laid to dry in a warm place for four or five days, or more (according to the moiſture of the part which adhered to the old plant or fruit) for, if they are immediately planted, they will rot. The certain rule of judging when they are fit to plant, is by obſerving if the bottom is healed over, and become hard; for, if the ſuckers are drawn off carefully from the old plants, they will have a hard ſkin over the lower part; ſo need not lie ſo long as thoſe which by accident may have been broken. But whenever a crown is taken from the fruit, or the ſuckers from the old plants, they ſhould be immediately diveſted of their bottom-leaves, ſo high as to allow depth for their planting; ſo that they may be thoroughly dry and healed in every part, leſt, when they receive heat and moiſture, they ſhould periſh, which often happens when this method is not purſued. If theſe ſuckers or crowns are taken off late in the autumn, or during the winter, or early in the ſpring, they ſhould be laid in a dry place in the ſtove, for a fortnight or three weeks before they are planted; but in the ſummer-ſeaſon they will be fit for planting in three or four days.

As to the earth in which theſe ſhould be planted, if you have a rich good kitchen garden mould, not too heavy, ſo as to detain the moiſture too long, nor over light and ſandy, it will be very proper for them without any mixture: but where this is wanting, you ſhould procure ſome freſh earth from a good paſture, which ſhould be mixed with about a third part of rotten neats-dung, or the dung of an old melon or cucumber-bed, which is well conſumed. Theſe ſhould be mixed ſix or eight months at leaſt before they are uſed; but if it be a year it will be better; and ſhould be often turned, that their parts may be the better united, as alſo the clods well broken. This earth ſhould not be ſcreened very fine; for, if you only clear it of the great ſtones, it will be better for the plants than when it is made too fine. You ſhould always avoid mixing any ſand with the earth, unleſs it be extremely ſtiff; and then it will be neceſſary to have it mixed at leaſt ſix months or a year before it is uſed; and it muſt be frequently turned, that the ſand may be incorporated in the earth, ſo as to divide its parts: but you ſhould not put more than a ſixth part of ſand; for too much ſand is very injurious to theſe plants.

In the ſummer ſeaſon, when the weather is warm, theſe plants muſt be frequently watered; but you ſhould not give them large quantities at a time. You muſt alſo be very careful that the moiſture is not detained in the pots by the holes being ſtopped; for that will ſoon deſtroy the plants. If the ſeaſon is warm, they ſhould be watered every other day; but in a cool ſeaſon, twice a week will be often enough: and during the ſummer ſeaſon, you ſhould once a week water them gently all over their leaves, which will waſh the filth off them, and thereby greatly promote the growth of the plants. There are ſome perſons who frequently ſhift theſe plants from pot to pot: but this is by no means to be practiſed by thoſe who propoſe to have large well-flavoured fruit; for unleſs the pots be filled with the roots, by the time the plants begin to ſhew their fruit, they commonly produce ſmall fruit, which have generally large crowns on them; ſo that the plants will not require to be new-potted oftener than twice in a ſeaſon: the firſt time ſhould be about the end of April, when the ſuckers and crowns of the former year's fruit (which remained all the winter in thoſe pots in which they were firſt planted) ſhould be ſhifted into larger pots; i. e. thoſe which were in halfpenny or three-farthing pots, ſhould be put into penny, or at moſt three half-penny pots, according to the ſize of the plants; for you muſt be very careful not to overpot them, nothing being more prejudicial to theſe plants. The ſecond time for ſhifting them is towards the latter end of Auguſt, or the beginning of September, when you ſhould ſhift thoſe plants which are of a proper ſize for fruiting the following ſpring into two-penny pots, which are full large enough for any of thoſe plants. At each of theſe times of ſhifting the plants, the bark-bed ſhould be ſtirred up, and ſome new bark added, to raiſe the bed up to the height it was at firſt made; and when the pots are plunged again into the bark-bed, the plants ſhould be watered gently all over their leaves, to waſh off the filth, and to ſettle the earth to the roots of the plants. If the bark-bed be well ſtirred, and a quantity of good freſh bark added to the bed, at this latter ſhifting, it will be of great ſervice to the plants; and they may remain in the tan until the beginning of November, or ſometimes later, according to the mildneſs of the ſeaſon, and will not require any fire before that time. During the winter ſeaſon theſe plants will not require to be watered oftener than every third or fourth day, according as you find the earth in the pots to dry: nor ſhould you give them too much at a time; for it is much better to give them a little water often, than to over-water them, eſpecially at that ſeaſon. You muſt obſerve never to ſhift thoſe plants which ſhew their fruit into other pots; for, if they are removed after the fruit appears, it will ſtop their growth, and thereby cauſe the fruit to be ſmaller, and retard its ripening; ſo that many times it will be October or November before the fruit is ripe: therefore you ſhould be very careful to keep the plants in a vigorous growing ſtate from the firſt appearance of the fruit, becauſe upon this depends the goodneſs and ſize of the fruit; for, if they receive a check after this, the fruit is generally ſmall and ill-taſted.

The method of judging when the fruit is ripe, is by the ſmell, and from obſervation; for, as the ſeveral ſorts differ from each other in the colour of their fruit, that will not be any direction when to cut them; nor ſhould they remain ſo long as to become flat and dead, as they alſo do when they are cut long before they are eaten: therefore, the ſureſt way to have this fruit in perfection, is to cut it the ſame day it is eaten; but it muſt be early in the morning, before the ſun has heated the fruit, obſerving to cut the ſtalk as long to the fruit as poſſible, and lay it in a cool, but dry, place, preſerving the ſtalk and crown to it, until it is eaten. *Miller's Gardener's Dictionary.*

ANANCITIS, in antiquity, a kind of figured ſtone, otherwiſe called ſynochitis, famous for its magical virtues in raiſing the umbræ, or ſhadows of the infernal gods.

ANAPÆST, in ancient poetry, a foot conſiſting of one long, following two ſhort ſyllables. It is the reverſe of a dactyl. See DACTYL.

ANAPHORA, in rhetoric, a repetition of the ſame word or words that concluded one ſentence at the beginning of the next.

The word is Greek, and derived from αναφερω, to transfer.

ANAPLEROSIS, in a general ſenſe, implies the ſame as repletion. See REPLETION.

The word is Greek, αναπληρωσις, and derived from αναπληρωω, to fill up, or recruit.

ANAPLEROSIS, among ſurgeons, ſignifies the ſupplying deficiences.

ANAPLEROTICS, in pharmacy, ſuch medicines as promote the growth of the fleſh, often called incarnatives.

ANARCHY, a confuſion introduced into a ſtate or kingdom, from its being deſtitute of a head or ruler.

The word is Greek, αναρχια, and compounded of α, priv. and αρχη, chief.

ANARTHRA, in natural hiſtory, a claſs of naked inſects, diſtinguiſhed from all others in having neither wings nor legs. The leech and all the ſpecies of worms belong to this claſs.

ANASARCA, in medicine, a ſpecies of the dropſy, wherein the ſkin appears puffed up and ſwelled, ſo that it yields to the impreſſion of the fingers like dough. See DROPSY.

The word is formed from the Greek, ανα, upon, and σαρξ, fleſh.

ANASTATICA, in botany, the name of a genus of plants, called in Engliſh the roſe of Jericho. The flower conſiſts of four roundiſh petals, diſpoſed in the form of a croſs; and its fruit is a ſhort bilocular pod, containing in each cell a ſingle roundiſh ſeed.

ANASTOMASIS, in anatomy, the opening of the mouths of the veſſels in order to diſcharge their contained fluids; as in the flux of the menſes, hæmorrhoids, bleeding at the noſe, &c.

The word is Greek, and compounded of ανα, and στομα, a mouth.

ANASTOMASIS alſo implies the communication of two veſſels at their extremities; as the arteries with the veins, &c.

ANATHEMA, among eccleſiaſtical writers, ſignifies whatever is ſeparated, ſet apart, or devoted; but is generally uſed to expreſs the cutting off a perſon from the privileges of ſociety, and communion with the church.

The word is Greek, and derived from ανατιθημι, to ſet apart.

There are two kinds of anathemas, the one judiciary, and the other abjuratory. The former can only be denounced by a council, pope, or biſhop; the latter makes a part of the ceremony of abjuration, the convert being obliged to anathematize the hereſy he abjures.

ANATHEMA, among the heathens, implied an offering or preſent made to ſome deity, and which was always hung up in the temple.

ANATOMICAL, ſomething belonging to anatomy.

ANATOMY, the art of diſſecting or ſeparating the ſeveral parts of animal bodies, in order to diſcover their ſtructure and uſe.

The word is Greek, ανατομη, and derived from ανατεμνω, to diſſect.

The ancients did not make any remarkable progreſs in anatomy; but the art was not neglected when the rays of learning began to ſpread their influence over Europe. Dr. Harvey publiſhed his Diſcovery of the Circulation of the blood in 1628, from which time anatomy made a ſurpriſing progreſs; and a multitude of writers on that ſcience appeared: and it would have been fortunate for anatomy, and ſtudents in this ſcience, if authors could have been ſatisfied with publiſhing their own diſcoveries, and animadverting on the errors of others; but inſtead of this many have thought that a diſcovery, ſometimes trifling enough, or a profeſſor's chair, have entitled them to write an entire ſyſtem; and by that means rendered it neceſſary to ſearch large volumes for diſcoveries, which a few pages were ſufficient to contain. Clopton Havers, an Engliſh phyſician, wrote admirably on the bones, and made ſome conſiderable diſcoveries with reſpect to the perioſteum and the marrow. He diſcovered in every joint particular glands, out of which iſſues a mucilaginous ſubſtance, whoſe nature he examined by ſeveral experiments; which, with the marrow ſupplied by the bones, conſtantly oil the joints, that both they and the muſcles might anſwer thoſe ends of motion for which nature deſigned them. This was a very uſeful diſcovery; ſince it has rendered abundance of things, before obſcure in that part of anatomy, plain and eaſy to be underſtood.

Dr. Willis, another Engliſh phyſician, was an excellent anatomiſt, particularly in what relates to the brain, nerves, ſtomach, and inteſtines. Picolhominus had, before him, obſerved that the brain, properly ſo called, and the cerebellum, conſiſt of two diſtinct ſubſtances, an outer aſh-coloured ſubſtance, through which the blood veſſels which lie under the pia mater in innumerable foldings and windings are diſſeminated; and an inner, every where united to it, of a nervous nature, that joins this ſubſtance to the medulla oblongata, which is the original of all the pairs of nerves that iſſue from the brain, and of the ſpinal marrow, that lies under the brain and cerebellum. Dr. Willis greatly improved theſe diſcoveries; he was ſo exact, that he traced this medullary ſubſtance through all its inſertions; examined the progreſs of all the nerves to every part of the body. Hence he not only demonſtrably proved the brain to be the fountain of ſenſe and motion; but alſo, by the courſes of the nerves, the manner how every part of the body conſpires with others to procure any particular motion, was clearly explained.

Pequet diſcovered the receptacle of the chyle, and ſhewed beyond contradiction, that the lacteal veſſels convey the chyle to this receptacle, and proved that it is thence carried by particular veſſels through the thorax, into the left ſubclavian vein, and ſo directly to the heart.

Alphonſus Borellus gave a mechanical account of the motion of animals, drawn from the ſtructure of the parts. As he had the advantage of Dr. Lower's diſcoveries, with reſpect to the order of the muſcular fibres of the heart, he was enabled to give a ſolution of all the appearances of the motions of the heart, and of the blood in the arteries, upon mathematical and mechanical principles. Marcellus Malpighius was deſervedly celebrated for his great ſkill and ſingular anatomical reſearches. His induſtry was not confined to the more perfect animals, but was extended to inſects, and even to vegetables, to the great improvement of natural knowledge and his own honour. He diſcovered, by means of his own microſcopes, the texture of the brain, tongue, lungs, liver and ſpleen; the mechaniſm of the reins was wholly unknown till Malpighius found it out; and by that means effectually confuted ſeveral notions, before entertained, of ſome ſecondary uſes of theſe parts, by proving that every part of the kidneys is immediately and wholly ſubſervient to that ſingle operation of freeing the blood from its ſuperfluous ſerum and ſalts. He alſo made ſome new and curious obſervations on the lymphatic veſſels and glands.

Frederic Ruyſch greatly contributed to the improvement of anatomy. This gentleman, from his infancy, devoted himſelf to phyſic, and began his firſt reſearches with the materia medica. The virtues of plants, the ſtructures of animals, the qualities of mineral bodies, chemical operations, and anatomical diſſections, were the objects that firſt ſtruck his fancy, and called for his improving hand. He was none of thoſe ſuperficial enquirers, who, either through prejudice or indolence, reſt ſatisfied before they have attained the truth: for he had ſtripped his mind of all thoſe unreaſonable attachments which are inconſiſtent with the temper of a philoſopher; and acquired ſuch an indefatigable turn, that his hardeſt labours in the purſuit of truth became his higheſt pleaſures and his only recreations.

Swammerdam, having diſcovered a method of injecting the veſſels with a certain matter, communicated his diſcovery to Ruyſch, who greatly improved it; and diſcovered a multitude of things before unknown.

Lieuwenhoek obliged the world with a great number of diſcoveries relative to anatomy, by means of his microſcopes; particularly the anaſtomaſes of the arteries and veins. Several other ingenious anatomiſts followed him, and carried the ſcience to a great degree of perfection.

Comparative ANATOMY, that which is employed in examining the bodies of brutes.

ANATOMY is uſed by ſome writers to denote the ſubject anatomized.

ANATOMY *of Plants.* See the article PLANT.

ANATRON. See NATRON.

ANAXIMANDRIANS, the followers of Anaximander, the firſt of the philoſophical atheiſts, who admitted of no other ſubſtance in nature but body.

ANCESTREL, in law, ſomething relating to, or that has been done by a perſon's anceſtors.

ANCHILOPS, in medicine, a ſmall tumour formed in the great angle of the eye, frequently degenerating into an abſceſs, or fiſtula lachrymalis.

ANCHOR, amongſt ſeamen, a ſtrong, heavy inſtrument of iron, ſunk from a ſhip to moor or retain her in a road, bay, or harbour.

An anchor is artfully calculated by the conſtruction of its parts, both to ſink into the ground when it reaches the bottom, and to bear a very great ſtrain before it can be drawn from thence by the weight of the ſhip; and, indeed, very ſeldom loſes its hold but in bad ground, (ſee the next article) ſo that the cable or rope, faſtened to it generally breaks before the anchor gives way. It is compoſed of a ſhank or ſhaft, two arms, two flukes, a ſtock, and a ring.

That the form of ſo very uſeful an inſtrument may be more clearly underſtood; let us ſuppoſe a round, maſſy beam of iron, ſtanding upright; at the lower end of which are two arms pointing north and ſouth, nearly of the ſame thickneſs with the ſhank, but tapering a little near the points, which are elevated above the horizontal plane about thirty degrees, or inclined to the ſhaft at an angle of ſixty degrees. On the upper part of each arm is a fluke, i. e. a ſtrong thick plate of iron, in form of an iſoſceles triangle, the baſe of which reaches into the middle of the arm. At the upper end of the ſhaft is fixed the ſtock, which is a long, ſquare beam of oak, in two parts, bolted together, the ends of which point eaſt and weſt. Cloſe above the ſtock is the ring to which the cable is bent or faſtened; the ring is curiouſly covered with a number of pieces of rope, equal in length to its circumference, which are firmly faſtened round it to preſerve the cable from being fretted or chafed by the iron.

Every ſhip has or ought to have three principal anchors, with a cable to each, viz. the ſheet, the beſt-bower, and ſmall-bower; there are, beſides, ſmaller anchors for tranſporting or removing a ſhip from place to place in a harbour or river, where there may not be room or wind for ſailing; ſuch as the ſtream anchor, the kedge and grappling, which laſt is however generally uſed for the boats.

To illuſtrate the foregoing deſcription, we have added a perſpective view of an anchor on plate III. *fig.* 7. where *a* is the ring to which the cable is faſtened, *b c* the beam or ſhank, *d e* the arm, or that which runs into the ground, *e f* the fluke or palm, and *g h* the ſtock.

ANCHOR-GROUND is ſuch as is neither too deep, rocky, nor too ſhallow; as in the firſt, the cable bears too nearly perpendicular, and is thereby apt to jerk the anchor from the ground; in the ſecond, the anchor is liable to hook the broken ends of rocks, and tear away the flukes, and the cable is ever in danger of being cut through by their edges; and in the third, the ſhip's bottom is apt to ſtrike in a high ſea, or at low water. An anchor is ſaid to come home when the violence of the wind or tide, acting upon the ſhip, makes her tear it up from the bed into which it had ſunk, and drag it along the ground. An anchor is ſaid to be foul when it either hooks ſome other anchor, wreck, or cable, under water; or when, by the wind abating ſuddenly, ſhe ſlackens her ſtrain and ſweeps round her anchor, taking a hitch or turn round one of the flukes with the ſlack cable, which muſt of neceſſity drag it out of the ground when the cable becomes tight: the anchor is then likewiſe ſaid to come home.

For the manner of forging anchors, ſee the article *Anchor* SMITH.

ANCHOR, in architecture, a ſort of carving reſembling an anchor. It is commonly placed as part of the enrichments of the boultins of Tuſcan, Doric, and Ionic capitals, and alſo of the boultins of the Doric, Ionic, and Corinthian cornices; anchors and eggs being carved alternately through the whole building.

ANCHOR, in heraldry, is uſed as an emblem of hope.

ANCHORAGE, a place where a ſhip may ſafely anchor.

ANCHORAGE, in law, implies a duty taken of ſhips for the uſe of the port or harbour where they come to an anchor.

ANCHORED, in heraldry, is ſaid of a croſs when its four extremities reſemble the fluke of an achor.

ANCHOVY, in natural hiſtory, the name of a ſmall fiſh, common in the Mediterranean, ſo nearly reſembling the common ſprat, that the latter has been often pickled and ſold for anchovies.

ANCHUSA, *Alkanet*, in botany, a ſpecies of burgoſs, with a rough hairy perennial plant, and unbranched procumbent ſtalks, differing chiefly from the common bugloſſes in the red colour of its roots. It grows wild about Montpelier and the eaſtern countries, and is cultivated in ſome of our gardens; but the roots produced in this climate are paler coloured than thoſe we receive from abroad.

The roots of anchuſa, when in perfection, are externally of a deep purpliſh red colour. The red cortical part, ſeparated from the whitiſh woody pith, imparts a fine deep red colour to oils, wax, and all unctuous ſubſtances, and to rectified ſpirit of wine. To water it gives only a dull browniſh hue. The ſpirituous tincture on being inſpiſſated to the conſiſtence of an extract, changes its fine red to a dark brown.

Alkanet root has little or no ſmell, and ſcarcely any taſte; nor is it regarded as a medicine. Its chief uſe is in colouring oils, plaiſters, lip ſalves, &c. which receive a fine deep red from one fortieth their weight of the root.

ANCHYLAS. See ANCHILOPS.

ANCLE, in anatomy; ſee TALUS.

ANCON, in anatomy, the gibbous eminence or flexure of the cubit.

ANCONES, in architecture, the corners or coins of walls, croſs beams, or rafters. Vitruvius calls the conſales by the ſame name.

ANCONY, in mineralogy, denotes a bloom of iron faſhioned into a flat bar, about three feet long, with a ſquare rough knot at each end.

ANCYLE, in antiquity, a kind of ſhield which, as the Romans pretended, fell from heaven in the reign of Numa Pompilius; and at the ſame time it was ſignified by a voice that Rome ſhould be miſtreſs of the world, as long as ſhe preſerved this ſacred buckler. It was therefore kept, with the utmoſt care, in the temple of Mars, under the direction of twelve prieſts, and leſt any ſhould attempt to ſteal this precious piece of armour, eleven others were made ſo like it, as not to be diſtinguiſhed from the original. Theſe bucklers were carried annually in proceſſion round the city of Rome.

ANCYLE, or ANCYLOSIS, in ſurgery, implies a diſtortion or ſtiffneſs of the joints, cauſed by a ſettlement of the humours, or a diſtention of the nerves; and therefore remedies of a mollifying and relaxing nature are required.

ANDANTI, in muſic, ſignifies that the notes are to be played diſtinctly.

ANDENA, in old writers, ſignifies the ſwarth made in mowing of hay, or as much ground as a man could ſtride over at once.

ANDREW, or *Knights of St.* ANDREW, an order of knighthood inſtituted in Scotland, generally called the order of the thiſtle. See THISTLE.

Knights of St. ANDREW is alſo an order inſtituted by Peter the Great, czar of Muſcovy, in the year 1698; the badge of which is a golden medal; on one ſide of which is repreſented St. Andrew's croſs; and on the other theſe words are engraven, *Czar Pierre monarque de tout la Ruſſie.* See plate IV. *fig.* 7.

St. ANDREW'S-DAY, a feſtival obſerved by the church on the 30th of November, in honour of the apoſtle St. Andrew.

ANDROIDES, in mechanics, a human figure, which, by certain ſprings, performs ſeveral external functions of a man.

The word is formed from the Greek, *ανηρ*, a man, and *ειδος*, reſemblance.

ANDROMACHUS'S *Treacle*, in pharmacy; ſee THERIACA.

ANDROMEDA, in aſtronomy, the name of a conſtellation of the northern hemiſphere, repreſenting a woman chained. The number of ſtars in this conſtellation, in Ptolemy's catalogue, are 23; in Tycho's 22; in Bayer's 27; and in Mr. Flamſtead's 84.

ANDROMEDA, in botany, a name given, by Linnæus, to the chamærhodendros of Tournefort. See CHAMÆRHODENDROS.

ANDROSACE, in botany, a diſtinct genus of plants, the flower of which conſiſts of one petal, broad at the top, and divided into five ſegments. Its fruit is a globular and ſingle capſule, containing a number of ſmall oval or roundiſh ſeeds fixed to a placenta.

ANECDOTE, among hiſtorians, implies ſome fact not formerly publiſhed to the world, or very little known.

The work is Greek, *ανεκδοτος*, and compounded of *α*, priv. *εκδοτος*, publiſhed.

ANEMUS, in ſome chemical authors, implies a wind-furnace uſed in making ſtrong fires for fluxing metals, &c.

The word is formed from the Greek, *ανεμος*, the wind.

ANEMOMETER, in mechanics, implies a machine for meaſuring the force or velocity of the wind.

The word is formed from the Greek, *ανεμος*, the wind, and *μετρεω*, to meaſure.

Various machines of this kind have been invented at different times, and by different authors. The following has been often experienced, and found to anſwer the intention.

An open frame of wood A B C D E F G H I (ſee plate III. *fig.* 6.) is ſupported by the ſhaft or arbor I. In the two croſs pieces H K, L M, is moved a horizontal axis Q M, by means of the four ſails *ab*, *cm*, *Of*, *gh*, expoſed to the wind in a proper manner. Upon this axis is fixed a cone of wood M N O; upon which, as the ſails move round, a weight R, or S is raiſed by a ſtring round its ſuperficies, proceeding from the ſmaller to the larger end N O. Upon this larger end or baſe of the cone, is fixed a rocket-wheel *k*, in whoſe teeth the click X falls, to prevent any retrograde motion from the depending weight.

The ſtructure of this machine ſufficiently ſhews that it may be accomodated to eſtimate the variable force of the wind; becauſe the force of the weight will continually increaſe, as the ſtring advances on the conical ſurface, by acting at a greater diſtance from the axis of motion: conſequently, if ſuch a weight be added on the ſmaller part M, as will juſt keep the machine in equilibrio in the weakeſt wind, the weight to be raiſed, as the wind becomes ſtronger, will be increaſed in proportion; and the diameter of the cone N O may be ſo large, in compariſon to that of the ſmaller end at M, that the ſtrongeſt wind ſhall but juſt raiſe the weight at the greater end.

If, for example, the diameter of the axis be to that of the baſe of the cone N O, as 1 to 28; then, if S be a weight of one pound at M on the axis, it will be equivalent to 28 pounds when raiſed to the greater end: if therefore, when the wind is weakeſt, it ſupports one pound on the axis, it muſt be 28 times as ſtrong to raiſe the weight to the baſe of the cone. If therefore a line or ſcale of 28 equal parts be drawn on the ſide of the cone, the ſtrength of the wind will be indicated by that number on which the ſtring reſts.

ANEMONE, the wind-flower, in botany, a genus of plants, of which there are two ſpecies, the cultivated and the wild; and both of theſe divided into ſeveral others, eſpecially the former, many of which are kept in gardens for the beauty of their flowers.

The following method of cultivation will fully anſwer the intention, and produce very elegant anemones.

Take a quantity of freſh untried earth, (from a common or ſome other paſture-land) that is of a light ſandy loam, or hazel mould; obſerving not to take it above ten inches deep below the ſurface; and if the turf be taken with it, the better, provided it hath time to rot thoroughly before it is uſed; mix this with a third part of cow-dung, and lay it in an heap, keeping it turned over at leaſt once a month for eight or ten months, the better to mix it, and rot the dung and turf, and to let it have the advantages of a free air: in doing this work, be careful to rake out all great ſtones, and break the clods; but I would by no means approve of ſifting or ſcreening the earth, which I have found very hurtful to many ſorts of roots; for when earth is very fine, upon the firſt great rains of winter or ſpring, the ſmalleſt particles thereof join cloſely together, and form one ſolid maſs; ſo that the roots often periſh for want of ſome ſmall ſtones to keep the particles aſunder, and make way for the tender fibres, to draw nouriſhment for the ſupport of the root.

The earth ſhould be mixed twelve months before it is uſed, if poſſible; but if you are conſtrained to uſe it ſooner, you muſt turn it over the oftener, to mellow and break the clods; and obſerve to rake out all the parts of the green ſward that are not quite rotten before you uſe it, which would be prejudicial to your roots, if ſuffered to remain. The beginning of September is a proper ſeaſon to prepare the beds for planting (which, if in a wet ſoil, ſhould be raiſed with this ſort of earth ſix or eight inches above the ſurface of the ground, laying at the bottom ſome of the rakings of your heap to drain off the moiſture; but, in a dry ſoil, three inches above the ſurface will be ſufficient: this ſoil ſhould be laid at leaſt two feet and an half thick, and in the bottom there ſhould be about four or five inches of rotten neats-dung, or the rotten-dung of an old melon or cucumber bed; ſo that you muſt take out the former ſoil of the beds to make room for it.

The beſt ſeaſon for planting theſe roots is about the latter end of September; and for thoſe of a middle ſeaſon, any time in October; but obſerve to perform this work, if poſſible, at or near the time of ſome gentle ſhowers: for if you ſhould plant them when the ground is perfectly dry, and there ſhould no rain fall for three weeks or a month after, the roots will be very apt to grow mouldy upon the crown; and, if they once get this diſtemper, they ſeldom come to good after.

In the beginning of April your firſt planted roots will begin to flower, which continue for three weeks, or more, according to the heat of the weather, or management in covering them, during the heat of the day, with mats or cloths; then the ſecond-planted ſort will come to ſucceed them, and theſe will be followed by thoſe planted in the ſpring; ſo that you may have theſe beauties continued for near two months together, or ſometimes longer, if the ſeaſon be favourable.

Towards the middle or latter end of May, the leaves of your firſt blown roots will decay; at which time you muſt take them out of the ground, clearing them from decayed ſtalks, and waſhing them, to take the earth clear from the roots; then ſpread them with a mat in a dry ſhady place, till they are perfectly dried, when you may put them up in bags and hang them out of the reach of mice, or other vermin, which will deſtroy many of the roots if they come at them.

Obſerve alſo to take up the latter-planted roots as ſoon as their leaves decay; for if they are ſuffered to remain long after in the ground, and there ſhould fall ſome ſhowers of rain, they would ſoon put forth freſh fibres, and make new ſhoots, when it would be too late to remove them: at the time when you take up the roots is the proper ſeaſon for breaking or parting them, which may be done by ſeparating thoſe that you would chuſe to make all poſſible increaſe from, into as many parts as you can conveniently, provided each of them have a good eye or bud; but thoſe you intend to blow ſtrong, ſhould by no means be parted too ſmall, which greatly weakens their flowering. *Miller's Gard. Dict.*

ANEMOSCOPE, a machine that ſhews either the courſe or velocity of the wind.

The word is formed from the Greek, ανεμος, the wind, and σκοπεω, to view.

The machine which ſhews the courſe of the wind, or from what point of the compaſs it blows, conſiſts of an index moving about an upright circular plate, like the dial of a clock, on which the thirty-two points of the compaſs are drawn inſtead of the hours. The index which points to the diviſions on the dial is turned by a horizontal axis, having a trundle-head at its internal extremity. This trundle-head is moved by a cog-wheel on a perpendicular axis, on the top of which a vane is fixed that moves with the courſe of the wind, and puts the whole machine in motion. The whole contrivance is extremely ſimple, and nothing required in the conſtruction, but that the number of cogs in the wheel, and rounds in the trundle-head, be equal; becauſe it is neceſſary that, when the vane moves entirely round, the index of the dial alſo makes a complete revolution.—An anemoſcope of this kind is placed in one of the turrets of the queen's palace.

The anemoſcope, calculated for indicating the force or velocity of the wind, in the ſame with what moſt writers call an anemometer; and we have accordingly deſcribed one of thoſe machines under that article. We ſhall here add another, contrived by the late Mr. Pickering, and publiſhed in the *Philoſophical Tranſactions*, N°. 473.

This anemoſcope is a machine four feet and a quarter high, conſiſting of a broad and weighty pedeſtal, a pillar faſtened into it, and an iron axis, of about half an inch diameter, faſtened into the pillar. Upon this axis turns a wooden tube, at the top of which is placed a vane, of the ſame materials, 21 inches long, conſiſting of a quadrant, graduated and ſhod with an iron rim, notched to each degree; and a counterpoiſe of wood, as in the figure, on the other. Through the centre of the quadrant runs an iron pin, upon which are faſtened two ſmall round pieces of wood, which ſerves as moveable radii to deſcribe the degrees upon the quadrant, and as handles to a velum or ſail, whoſe pane is one foot ſquare, made of canvas, ſtretched upon four battens, and painted. On the upper batten, next to the ſhod rim of the quadrant, is a ſmall ſpring, which catches at every notch correſponding to each degree, as the wind ſhall, by preſſing againſt the ſail, raiſe it up; and prevents the falling back of the ſail, upon leſſening of the force of the wind. At the bottom of the wooden tube is an iron index, which moves round a circular piece of wood faſtened to the top of the pillar on the pedeſtal, on which are deſcribed the thirty-two points of the compaſs. The figure of this machine may be ſeen, (plate IV. *fig*. 8.) where *a* is the pedeſtal *b*; the pillar in which the iron axis is fitted: *c*, the circle of wood, on which are deſcribed the 32 points of the compaſs; *e*, the wooden tube upon its axis; *f*, the velum; *g*, the graduated quadrant; *h*, the counterpoiſe of the vane.

Fig. 9. The velum takes off: *a*, the plane of the velum; *b*, the ſpring; *c*, *c*, the wooden radii; *d*, *d*, the holes through which the pin in the center of the quadrant goes. Its uſes are the following.

1. Having a circular motion round the iron axis, and being furniſhed with a vane at top, and index at the bottom, when once you have fixed the artificial cardinal points, deſcribed on the round piece of wood on the pillar, to the ſame quarters of the heavens, it gives a faithful account of that quarter from which the wind blows.

2. By having a velum or ſail elevated by the wind along the arch of the quadrant to an height proportionable to the power of the column of wind preſſing againſt it, the relative force of the wind, and its comparative power,

at any two times of examination, may accurately be taken.

3. By having a ſpring fitted to the notches of the iron with which the quadrant is ſhod, the velum is prevented from returning back upon the fall of the wind; and the machine gives the force to the higheſt blaſt, ſince the laſt time of examination, without the trouble of watching it.

The ingenious contriver of this machine tells us, that he carefully examined what dependence may be had upon it, during the ſtorms of February, 1743-4, and found that it anſwered exceeding well; for that, in ſuch winds as the ſailors call violent ſtorms, the machine had ſix degrees to ſpare for a more violent guſt, before it comes to a horizontal poſition.

It is certainly to be depended upon in ordinary weather, the velum being hung ſo tenderly as to feel the moſt gentle breeze. There is however reaſon to fear, that the expoſing the anemoſcope to all winds for a continuance, muſt diſorder it, eſpecially irregular blaſts and ſqualls. It may not therefore be amiſs, in violent weather, for the obſerver to take the tube with its vane and velum in his hand, in order to know the force of the wind; and, when he has finiſhed his obſervations, to carry the machine into the houſe, till the violence of the ſtorm is abated, when it may be replaced in its former ſituation.

ANETHUM, *Dill*, in botany, an annual umbelliferous plant, with very finely divided leaves, and yellow flowers; producing pale yellowiſh oval ſeeds, flatted on one ſide, marked with three longitudinal ſtriæ on the other, and ſurrounded about the edges with a leafy margin. It is a native of the warmer climates, cultivated with us in gardens, flowers in July, and in September ſheds its ſeeds, by which the plant is plentifully propagated.

The ſeeds of dill have a moderately warm pungent taſte, and an aromatic ſmell, but not of the moſt agreeable kind; they are given as carminatives, to the quantity of a dram at a time, in flatulent colics, and indigeſtion from a laxity of the organs and viſcidity of the humours. The leaves are weaker and leſs grateful than the ſeeds; the roots have nothing of their flavour.

Water extracts very little of the virtues of dill ſeeds by infuſion or digeſtion for many hours. In boiling, their whole flavour exhales along with the watery vapour, and may be collected by diſtillation: the diſtilled water, drawn off to the quantity of a gallon from a pound of the ſeeds, is kept in the ſhops, and occaſionally made the baſis of carminative draughts and juleps. Along with the water ariſes a conſiderable portion of eſſential oil, in taſte moderately pungent, and ſmelling ſtrongly of the dill: this is given from one to three or four drops or more, as a carminative, aud in hiccups.

Rectified ſpirit, digeſtedon dill ſeeds, readily extracts both their ſmell and taſte: the colour of the tincture is a bright yellow. The ſpirit, gently diſtilled off from the filtered liquor, brings over very little of its flavour, leaving in the extract nearly all the active parts of the dill.

ANEURISM, in ſurgery, a tumour ariſing from the dilatation, or rupture of the coats of an artery. Aneuriſms uſually proceed from an artery being accidentally cut or pricked in bleeding, or from preternatural diſtenſion, or a corroſion of its coats, &c.

When an artery happens to be cut off by a lancet, the blood guſhes out impetuouſly by ſtarts, and is not eaſily ſtopped; an inflammation and change of colour in the part about the veſſel ſucceed, with a tumour and inability to move the arm, if the lancet were uſed there, from a collection of extravaſated blood lodged between the integuments and the interſtices of the muſcles. If the coats of the artery have been corroded, the ſymptoms are nearly the ſame, but come on more ſlowly, and prove leſs violent, without any hæmorrhage. The ſigns of a true aneuriſm, that is, when the dilatation of the coats of an artery happens, are a pulſation eaſy to be felt, and ſometimes viſible to the eye, the tumour generally appearing of the natural colour of the ſkin. This tumour varies in the magnitude, being ſometimes as large as an orange, and at others, as big as a child's head; and, when preſſed with the finger, generally gives way, but preſently reſtores itſelf upon removal thereof.

An aneuriſm happening upon ſome error in venæſection, is dangerous; but if the blood ceaſes to flow from the wounded artery, and parts itſelf between the interſtices of the muſcles, the chirurgical operation is neceſſary; or if that be delayed for a few days, the extirpation of the limb becomes indiſpenſible. It is alſo dangerous if it proceeds from a corroſion of the coats of the artery; and the more ſo when it happens in a part where the operation cannot be performed: but an aneuriſm from a diſtenſion of the canal, without any rupture, is ſeldom fatal; though rekoned when large, incurable; the chief inconveniencies being the magnitude of the tumour, and the pulſation. The diet in all theſe caſes ſhould be ſlender and balſamic, and the exerciſe gentle.

ANGARIA, in antiquity, a kind of public ſervice impoſed upon the provinces, which conſiſted in providing horſes and carriages for the conveyance of military ſtores from one place to another.

ANGARIA alſo ſignified any kind of oppreſſion or ſervice performed by compulſion.

ANGEIOGRAPHY, among anatomiſts, ſignifies a deſcription of the ſeveral veſſels of the human body; as the arteries, veins, lymphatics, nerves, &c.

The word is formed from the Greek, *αγγειον*, a veſſel, and *γραφω*, to deſcribe.

ANGEIOTOMY, in ſurgery, implies the opening a vein or artery, as in bleeding; and conſequently includes both arteriotomy and phlebotomy.

The word is formed from the Greek, *αγγειον*, a veſſel, and *τεμνω*, to cut.

ANGEL, a name given to thoſe ſpiritual intelligent beings who are ſuppoſed to execute the will of the Divine Being in the government of the world.

The word is Greek, *αγγελος*, and derived from *αγγελλω*, to carry a meſſage, or execute an order.

All religions have admitted of the exiſtence of angels. The Greeks and Latins acknowledged them under the names of genii and demons; and in the alcoran we find frequent mention of them; the profeſſors of the Mahometan religion aſſigning them various orders and degrees, as well as different employments, both in heaven and earth.

Nothing is more frequent in ſcripture than the miſſions and apparitions of good and bad angels: God ſends them to declare his will, to correct, teach, reprove, and comfort: God gave the law to Moſes, and appeared to the old patriarchs by the mediation of angels, who repreſented him and ſpoke in his name. The exiſtence of angels is ſuppoſed in all religions.

Though the Jews in general believed the exiſtence of angels, there was a ſect among them (the Sadducees) who denied the exiſtence of all ſpirits whatever, God only excepted: and yet the Samaritans and Caraites, whom the Jews repreſented as Sadducees, acknowledged ſuch beings. Before the Babyloniſh captivity, the Hebrews ſeem not to have known the name of an angel: the Talmudiſts ſay they brought them from Babylon: it is true we find many of them called by their names in the book of Enoch; but this we know is ſpurious, and was written after the captivity we are ſpeaking of. Tobit, who is thought to have lived at Nineveh, ſome time before the captivity, is the firſt who was called an angel by his proper name: he mentions Raphael, who conducted Tobias into Media; and Daniel, who lived at Babylon ſome time after Tobit, has taught us the names Michael and Gabriel. In the New Teſtament we find only the two latter angel mentioned by name. It has been queſtioned, whether the ancient Hebrews paid divine homage to angels or not. The form of benediction which Jacob uſed in bleſſing the ſons of Joſeph, (the angel which redeemed me from all evil bleſs the lads) may ſeem to imply that they did. The rabbins, in gloſſing upon the text, obſerve, that the prayers of their anceſtors were not directly addreſſed to angels, but it was really God they invoked, when they prayed to them; they only go to them as to the king by his miniſters, and as one that preſents his petition to the firſt officer of the crown; yet ſtill looks to the king as the ſource and ſpring of his happineſs and favour that he has received. But this expoſition is refuted by others, who remark that Jacob, after he had directly applied himſelf to God, and begged of him both temporal and eternal bleſſings on his two grand-ſons, then addreſſed himſelf to the angel, to obtain of him, that he would keep them from all evil; from whence they conclude, that Jacob addreſſed his prayers directly to the angel to whom he aſcribed the power of preſerving from evil, whilſt he left to God the privilege of beſtowing all that was good; and if the prayer of the patriarch was implicitly addreſſed to God, as the fountain of goodneſs, yet he certainly prayed explicitly to the angel. But, notwithſtanding this diſpute, the beſt Chriſtian expoſitors deny that this invocation of Jacob implies any thing like a prayer to the angel. Some indeed conceive, that the angel in this place is the ſecond perſon in the trinity; an opinion refuted by others, who more juſtly ſay, that Jacob intended no more than a deſire that his children might enjoy the angelical protection, by the ſpecial favour of God to them; for it is ſuch an expreſſion as that of David to a contrary purpoſe, "Let the angel of the Lord perſecute them," where no one will ſay he prays to an angel, though his words are exactly like thoſe of Jacob.

There are divers opinions concerning the time when angels were created. Some think they were created at the ſame time as the Heavens; and that Moſes included them under this name, ſaying, "In the beginning God "created the Heavens." Others have conjectured, that he inclined to repreſent them under the name of light, which God created the firſt day; of this opinion is St. Cyril. Others again have aſſerted, that they were created before the ſenſible world; which opinion Job ſeems to favour, when he ſays, "Where waſt thou when I laid "the foundation of the earth;—and all the ſons of "God ſhouted for joy?" The Hebrews think they were created on the ſecond day of the world; and that God conſulted with the angels when he ſaid, "Let us make "man in our own image." Others are of opinion, that angels were created on the fifth day. Origen, and other Greek and Latin fathers, think they exiſted before the world; and Dr. Hyde thinks a very long time before the world. See *Baſnage's Hiſt. des Juiffs*, lib. 4. cap. 9. The philoſophers of the Peripatetic ſect believed they were coæval with God; and, conſequently, that they exiſted from all eternity. The Greek fathers of the Chriſtian church were generally inclined to believe they were created before the world. Some few, indeed, were of different opinions, among whom is Epiphanius.

Though it is an univerſal opinion that angels are of a ſpiritual, incorporeal nature, yet many of the old fathers, miſled by a paſſion in Geneſis, where it is ſaid, "That "the ſons of God (or the angels) ſaw the daughters of "men, that they were fair, and they took them wives "of all which they choſe," imagined them to be corporeal, and capable of ſenſible pleaſures. Other fathers indeed, and thoſe in great number, have aſſerted angels to be purely ſpiritual; and this at preſent is the common opinion of the ſchools.

There have been a great many diſputes and varieties of fancy concerning the number, order, nature, and power of angels; moſt of which are not to be reſolved by ſcripture or tradition. The author of the books *De Hierarchia cæleſti*, who wrote about the beginning of the ſixth century, is the firſt who ventures to range the angels into three hierarchies and nine orders. The Jews likewiſe diſtinguiſhed them into ſeveral orders, and ſet, as it were, a general at the head of them; they called him Metatron, the ſame with the Chriſtian St. Michael.

As to the office or employment of angels, ſome are ſaid to preſide over empires, nations, provinces, cities, and particular perſons. Theſe latter are ſtiled guardian angels. Thus St. Michael is acknowledged to be the protector of the people of Iſrael; and the angel Gabriel ſpeaks of the angel who was protector of Perſia, according to the generality of interpreters, when he ſays that the prince of the kingdom of Perſia withſtood him one and twenty days. St. John wrote his Revelations to the angels of the ſeven chriſtian churches in Aſia Minor, whereby he does not mean only the biſhops of thoſe churches, but, in the judgment of many of the fathers, the angels alſo who were appointed for their protection. The learned Dr. Prideaux obſerves, that the miniſter of the ſynagogue, who officiated in offering up the public prayers, being the mouth of the congregation, delegated by them as their repreſentative, meſſenger, or angel, to ſpeak to God in prayer for them, was therefore, in the Hebrew language, called the angel of the church; and from thence the biſhops of the ſeven churches of Aſia are, by a name borrowed from the ſynagogue, called the angels of thoſe churches. As to guardian angels, they are very clearly deſcribed in the Old Teſtament. Jacob ſpeaks of the angel who had been his guide in all his journies, and had delivered him out of all his dangers. The Pſalmiſt, in ſeveral places, mentions angels as the protectors of the righteous. In the New Teſtament we hear of St. Peter's angel who ſet him at liberty; and Jeſus Chriſt enjoins us not to deſpiſe little ones, becauſe their angels continually behold the face of God. The Jews, and the very heathens, believed that particular angels were commiſſioned to attend us, and had the care of our conduct. Heſiod, the moſt ancient, or at leaſt one of the moſt ancient Greek authors, ſays, that there are good angels upon earth, ſent by Jupiter for the protection of mankind, and to obſerve the good or evil which they practiſe. Plato ſays, that every one of us has two demons, or two genius's, one inclining us to evil, the other directing us to good; though Apuleius ſays, that Plato aſſigned but one demon to every man. The ancient Chriſtians, as Origen and St. Auguſtine, aſcribe to angels the office of preſenting our prayers to God; and the Chriſtians, in general, agree with the Platoniſts, that God makes uſe of the miniſtry of angels, to carry his orders, to work miracles, and to foretel future events.

Angel, in commerce, the name of a gold coin formerly current in England. It had its name from the figure of an angel repreſented upon it, weighed four pennyweights, and was twenty-three and a half carats fine. It had different values in different reigns; but is at preſent only an imaginary ſum, or money of account, implying ten ſhillings.

ANGELICA, in botany, a large umbelliferous plant, with hollow-jointed ſtalks, and indented oval, pointed leaves, ſet in pairs along the middle rib, and having an odd one at the end, containing a milky juice, which on drying contracts a yellowiſh colour; the ribs of the leaves are channelled on the upper ſide, and joined to the ſtalks by large membraneous baſes or ſheaths. The ſeeds are of a pale whitiſh colour, ſomewhat oval, flat on one ſide, and convex, with three longitudinal ridges on the other, ſurrounded about the edges with a leafy margin. The roots are long and thick, of a dark brown colour on the ſurface, but the internal white and juicy; and, when dry, of a ſpongy texture.

There are two ſpecies of angelica, the wild and the garden, diſtinguiſhed by the epithets *ſylveſtris* and *ſativa*. The former grows wild, in moiſt grounds, in ſeveral parts of England; is pirennial, and flowers in July: the latter is cultivated in gardens. They are ſimiliar in quality; but the latter ſuppoſed to be the ſtronger.

The garden angelica is naturally a biennial plant; but if the ſtalks are cut down before they run to flower, the roots will ſend forth new heads, and may, by this means, be continued for many years. The roots are in their greateſt perfection in the ſecond ſpring: they ſhould be thoroughly dried, kept in a dry place, and frequently aired, otherwiſe they will grow mouldy, and be eaten by worms.

The roots of angelica are one of the principal aromatics of European growth, though not much regarded in the preſent practice. They have a fragrant agreeable ſmell, and a bitteriſh pungent, mixed with a pleaſant ſweetiſh taſte. On wounding the freſh roots early in the ſpring, it yields from the inner part of the bark, an unctuous and odorous juice of a yellowiſh colour; and which, being gently exſiccated, retains its fragrance, and proves an elegant aromatic gummy-reſin. On cutting the freſh root longitudinally, the yellowiſh matter, in which the virtue and flavour of the angelica reſides, appears concreted into little veins. In this ſtate it readily and totally diſſolves by rectified ſpirit of wine, and tinges the menſtruum of a bright golden colour. On diſtilling off the ſpirit from this ſolution, very little of the flavour of the angelica riſes with it, nearly all the active matter of the root remaining concentrated in the extract. Water alſo gains from this root a pretty deep yellow colour, but extracts little of its taſte or ſmell. In diſtillation with water, there ariſes a ſmall portion of eſſential oil, of a highly pungent taſte, and ſmelling ſtrongly of the angelica: the remaining decoction, thus diveſted of the aromatic matter of the root, is nauſeouſly ſweetiſh and ſubacrid.

The other parts of the plant have the ſame taſte and flavour with the roots; but their active principles are far more periſhable. The ſeeds, which come neareſt to the roots, can ſcarcely be kept till the ſpring after they have been gathered, without loſing their vegetative power, as well as diminiſhing their medicinal virtues; and, with regard to the leaves, they loſe the greater part of their virtues on being barely dried: for ſome purpoſes, however, they are well adapted; the freſh leaves, as well as the ſeeds, being diſtilled with water, give over to the liquor, the whole of their aromatic matter, which in this form proves ſufficiently durable. The virtues of the ſeeds, like that of the roots, is very imperfectly extracted by water, and completely by ſpirit; and though it riſes totally by diſtillation with water, is left by the ſpirit almoſt entire in the inſpiſſated extract. The ſpirituous tincture is of a bright ſtraw colour; the watery infuſion of a dark brown.

The ſtalks, candied with ſugar, make a very agreeable ſweetmeat.

ANGELICA, in antiquity, the name of a celebrated dance performed at the pagan feaſts of Greece; and ſo called from the dancers being dreſſed in the habit of meſſengers.

ANGELICS, *Angelici*, in eccleſiaſtical hiſtory, an ancient ſect of heretics, ſuppoſed to have obtained this appellation from their exceſſive veneration for angels.

ANGELICS is alſo the name of a congregation of nuns, founded at Milan in 1534, by Louiſa Torelli, counteſs of Guaſtalla. They obſerve the rule of St. Auguſtine.

ANGELICS is likewiſe the name of an order of knights inſtituted in 1191, by Angelus Flavius Comnenus, emperor of Conſtantinople.

Some will have this order, which ſtill ſubſiſts in Italy, to have been much more ancient, and that Conſtantine the Great was its founder.

ANGELITES, in eccleſiaſtical hiſtory, a ſect of Chriſtian heretics, in the reign of the emperor Anaſtaſius, and the pontificate of Symmachus, about the year 494; ſo called from Angelium, a place in the city of Alexandria, where they held their firſt meetings. They were called likewiſe Severites, from one Severus, who was the head of their ſect; as alſo Theodoſians, from one among them, named Theodoſius, whom they made pope at Alexandria.

They held, that the perſons of the Trinity are not the ſame; that none of them exiſts of himſelf, and of his own nature, but that there is a common god, or deity, exiſting in them all; and that each is God, by a participation of this deity.

ANGELOT, the name of a gold coin ſtruck at Paris, while ſubject to the Engliſh; and ſo called from the figure of an angel, ſupporting the arms of England and France.

ANGER, a violent paſſion of the mind, conſiſting in a propenſity to take vengeance on the author of ſome real or ſuppoſed injury done the offended party.

ANGERONA, in mythology, the name of a pagan deity whom the Romans prayed to for the cure of a diſtemper, called the quinſy, in Latin, *angina*. Pliny calls her the goddeſs of ſilence and calmneſs of mind, who baniſhes all uneaſineſs and melancholy. She is repreſented with her mouth covered, to denote patience and refraining from complaints. Her ſtatue was ſet up, and ſacrificed to, in the temple of the goddeſs Volupia, to ſhew that a patient, enduring of affliction, leads to pleaſure.

ANGERONALIA, feaſts inſtituted at Rome in honour of the goddeſs Angerona. They were celebrated on the 21ſt of December.

ANGINA, in phyſic, a violent inflammation of the throat, generally called quinzy. See the article QUINZY.

ANGINA *Lini*, in botany, a name by which ſome call the dodder growing on flax, from its choaking that plant.

ANGIOSPERMA, in the Linnæan ſyſtem of botany, implies thoſe plants of the didynæmia claſs, which have their ſeeds incloſed in a capſule or ſeed veſſel.

ANGLE, *Angulus*, in geometry, is the mutual inclination of two lines, which meet and form an angle in their point of interſection. Such is the angle BAC, (plate X. *fig.* 3.) formed by the right lines AB, AC, meeting in the point A. The lines AB and AC are called the legs of the angle, and point of interſection, the vertex.

Angles are ſometimes denoted by a ſingle letter affixed to the vertex, or angular point, as A, and ſometimes by three letters, whereof the middle letter ſhews the angular point. Thus the angle formed by the right lines AB, AC, meeting in the point A, is called the angle BAC, or CAB.

The Meaſure of an ANGLE is the arch of a circle deſcribed on the angular point, intercepted between the two lines which form the angle. Thus the meaſure of the angle BAC is the arch EF, intercepted between the two legs AB, AC; and as many degrees as are contained in that arch, ſo many degrees the angle BAC is ſaid to conſiſt of.

Hence it will be eaſy to meaſure the quantity of any angle geometrically; for if you take the diſtance of the arch EF, intercepted between the lines AB, AC, and apply it to a line of chords, whoſe radius is AE, you will have the number of degrees contained in the angle BAC; or if you apply the center of a protractor to the angular point A, in ſuch a manner that the leg AB lies directly under the limb of the protractor, the degree on the arch cut by the other leg AC will give the quantity of the angle required.

ANGLES are either *right*, *acute*, or *obtuſe*.

A right ANGLE is that whoſe legs are perpendicular to each other, as ABC (plate X. *fig.* 6.) the arch intercepted between them being exactly 90°.

An acute ANGLE is that which is leſs than a right angle, or 90°. as the angle DBC.

An obtuſe ANGLE is that which is greater than a right angle, as EBC.

Adjacent ANGLES are ſuch as have the ſame vertex, and one of the legs continued beyond the angular point. Thus the angles CEB and CEA (*fig.* 4.) are adjacent angles. The ſum of theſe adjacent angles is always equal to two right angles; (13 Euclid. 1.) and therefore, if one of them be acute, the other will be obtuſe, and the contrary. Whence if either of them be given, the other is alſo given, it being the ſupplement of the former.

Vertical ANGLES are thoſe formed by two right lines interſecting each other. Thus the right lines AB, CD, (*fig.* 4.) by their interſection in E, form the vertical angles AEC, DEB, and AED, CEB.

Alternate ANGLES are thoſe acute or obtuſe angles formed by a right line cutting two parallel right lines. Thus if AB and CD (*fig.* 5.) are parallel, and GH cuts them in I and K, the angles AIK, DKI, and BIK, IKC, are alternate angles.

The alternate angles are always equal to each other. (18 *Eucl.* 1.)

ANGLE *at the Center of a Circle*, is an angle in a circle, whoſe vertex is in the center of that circle.

ANGLE *at the Periphery*, or *in a Segment*, is an angle whoſe vertex is in the periphery, and its legs two chords of the circle. Thus AB, BC, are two chords of the circle ABCD, (*fig.* 8.) making an angle B at the periphery, which is called an angle in a ſegment.

This angle is always equal to half the angle at the center, ſtanding upon the ſame arch (6 Euclid. 3.) Alſo all angles in a ſegment, ſtanding upon the ſame arch, are equal to one another. Thus the angles ABC, AGC, AFC, are equal, and are each equal to half the angle AEC at the center.

If the right line AB (*fig.* 9.) touch the circle in C, and the chord CD be drawn, then will the angle ACD be equal to any angle C E D, made in the ſegment D E C. (Euclid. 32.3.)

When the arch is a ſemicircle, the angle will be a right angle. Thus if the arch A B C (*fig.* 11.) be a ſemicircle, the angle A B C will be a right angle. When it is greater than a ſemicircle, as *fig.* 12. the angle will be acute; but when leſs, as *fig.* 10. it will be obtuſe. (31 Euclid. 3.)

Spherical ANGLE is an angle formed by two great circles of the ſphere.

Thus, let A C D E B (*fig.* 15.) repreſent a ſphere, upon whoſe ſurface let two arches of great circles A B, C E, be drawn, interſecting each other in the point D; then will A D C, D C A, B D E, or D B E, be a ſpherical angle.

The meaſure of a ſpherical angle, as A D C, is the arch of a great circle A C, deſcribed from the vertex A, as its pole, and intercepted between the legs A D, C D; or it is the diſtance of the poles of the two circles A B, C E: becauſe the meaſure of a ſpherical angle is the ſame as the inclination of the planes of the great circles that form it, and the meaſure of the quantity of the inclination is the arch A C, D being the pole of the great circle A C B E A.

Mixed Line ANGLE is that comprehended between a right line and a curve line, as the angle A B C. (*fig.* 14.)

ANGLE *of Communication*, in aſtronomy, is the diſtance between the true place of the ſun ſeen from the earth, and the place of a planet reduced to the ecliptic. Thus let T F (*fig.* 13.) be the orbit of the earth T, A P G that of the planet P, S the ſun, and B the planet's place reduced to the ecliptic; then will the angle T S B be the angle of communication.

ANGLE *of Contact* is that formed by a tangent, and its curve at the point of contact. Thus, if the right line A B (plate XII. *fig.* 1.) touch the circle H A K E, in the point A, the angle B A K is an angle of contacts. Euclid demonſtrates that the right line A B, ſtanding perpendicular on the radius C A, touches the circle only in one point; nor can there be any other right line drawn between the tangent and the circle. Hence the angle of contact is leſs than any rectilinear one, and the angle of the ſemicircle between the radius C A, and the arch A K, is greater than any rectilinear acute angle.

This paradox of Euclid has exerciſed the wits of the mathematicians: it was the ſubject of a long controverſy between Peletarius and Clavius, the firſt of whom maintained the angle of contact heterogeneous to a rectilinear one, as a line is heterogeneous to a ſurface; the latter maintained the contrary. Dr. Wallis has a formal treatiſe on the angle of contact, and of the ſemicircle, where, with other great mathematicians, he approves of the opinion of Peletarius. Sir Iſaac Newton ſhews that, if the curve H A E be a cubic parabola, the angle of contact, where the ordinate D F is as the cube root of the abſciſſa, the angle B A F contained under the tangent A B in its vertex and the curve, is infinitely greater than the circular angle of contact contained by the ſaid tangent and the arch of the circle; and that, if other parabolas of higher kinds be deſcribed to the ſame axis and vertex, whoſe abſciſſas A D are as the ordinates DF^4, DF^5, DF^6, &c. you will have a ſeries of angles of contact going on infinitely, of which any one is infinitely greater than that next before it. See CURVATURE.

ANGLE *of Incidence* is that which the line of direction of a ray of light, &c. makes at the point where it firſt touches the body it ſtrikes againſt, with a line erected perpendicular to the ſurface of that body. Thus, if a ray of light, &c. move in the direction A B (plate XII. *fig.* 2.) till it touch the ſurface *abcd*, in the point B, then will the angle, intercepted between A B, the line of direction, and the perpendicular B F, be the angle of incidence.

ANGLE *of Reflection* is the angle intercepted between the line of direction of a body rebounding, after it has ſtruck againſt another body, and a perpendicular erected at the point of contact. Thus, if a body moving in the direction A B (plate XII. *fig.* 2.) ſtrike the ſurface *abcd* in the point B, and is reflected in the direction B C, the angle, contained between that line and the perpendicular B F, is called the angle of reflection.

The angle of incidence is always equal to the angle of reflection; and, upon this equality, the whole ſcience of catoptrics is founded.

ANGLE *of Emergence* is that which any body, as a ray of light, &c. projected from one fluid or medium into another, makes with its quitting the latter medium with a perpendicular to its ſurface. Thus, let A B and C D (plate XII. *fig.* 3.) be parallel planes terminating water or glaſs, and ſuppoſing a body, projected in the direction F E, entering this medium at E, and going out of it at G, in the direction G H or G M; let G K be perpendicular to A B, C D then the angle K G H, or K G M, is an angle of emergence. The ſine of the angle of emergence, when the projected body paſſes quite through the medium, is to that of incidence in a conſtant ratio: but when the projected body flies back or out of the medium, the ſame way it entered it, without paſſing through, then the angle of incidence will always be equal to the angle of emergence. In order to demonſtrate theſe uſeful and fundamental propoſitions in a conciſe manner, we will ſuppoſe it admitted that nature, in all its operations, takes the ſhorteſt ways. Now, as light cannot move in different mediums with the ſame velocity, let the ratio of the velocity of light, during its motion from A to B, (plate XII. *fig.* 4.) where it begins to be refracted to its velocity, while it is refracted in its motion from B to C, be expreſſed by $\frac{m}{n}$; then the times of the deſcriptions of the lines A B, B C, will be as $n \times AB$ to $n \times BC$. Let fall the perpendiculars A Q, C P, and make $AQ = a$, $CP = b$, $PQ = c$, $PB = x$, then will $BQ = c - x$, and conſequently $BC = \sqrt{b^2 + x^2}$, and $AB = \sqrt{aa + cc - 2cx + x^2}$, whence the time in which $AB + BC$ is moved through, is $= m \times \sqrt{b^2 + x^2} + n \times \sqrt{a^2 + c^2 - 2cx + x^2}$ which muſt be a minimum; and ſo the fluxion thereof, viz. $\frac{m x \dot{x}}{\sqrt{b^2 + x^2}} + \frac{n x \dot{x}}{\sqrt{a^2 + c^2 - 2cx + x^2}} = 0$. Whence $\frac{m x}{\sqrt{b^2 + x^2}} = \frac{n \times \overline{c - x}}{\sqrt{a^2 + c^2 - 2cx + x^2}}$, that is, $m \times \frac{PB}{BC} = n \times \frac{BQ}{AB}$, make $BC = AB$; then will $m \times PB = n \times BQ$; and conſequently $m : n :: BQ : PB$.

Whence if A B or B C be taken for the radius, B Q will be the ſine of the angle A, and P B the ſine of the angle C; that is, ſince A Q and P C are parallel to D E, P B is the ſine of the angle C B E, and B Q the ſine of A B D; viz. P B is the ſine of the refracted angle, and B Q the ſine of the angle of incidence. Whence the ſine of the angle of incidence is to the ſine of the refracted angle in a conſtant ratio, viz. that of the velocity of light before refraction to the velocity during its refraction.

ANGLE *of Refraction*, in dioptrics, is the angle which a ray of light refracted, makes with a ray of incidence, continued beyond the refracting ſurface. Thus, let D E (plate XII. *fig.* 5.) be the refracting ſurface, M N a ray of incidence, and N E the refracted ray; alſo let N H be the continuation of the ray of incidence, then is F N H the angle of refraction.

Refracted ANGLE is the angle which a refracted ray forms with a perpendicular to the refracting ſurface. Thus, let G N be the perpendicular to the refracting ſurface D E, then is G N F the refracted angle. There are ſeveral methods for obſerving the quantity or law of refraction; but the following, which is very eaſy to be underſtood, will be ſufficient; and, as the refraction from air to glaſs is chiefly wanted in dioptrics, we have choſen it for an example. — Let F G E B C (plate XII. *fig.* 6.) repreſent a well poliſhed glaſs cube, ſtanding upon a plane board N I P O, at the end of which there is another N A B I, fixed at right angles, having the ſame height C H with the ſide of the cube, and let their common breadth I N be greater than the ſide I H of the cube, and the length O N be much longer than either; then let theſe boards, with the cube fixed on them, be turned to the ſun at different altitudes above the horizon, and note the end of the ſhadow of the ſide A B, both within the cube at K, and without it at L; then, ſince C K is the refracted ray, and C L the unrefracted one, H C K will be the refracted angle, and HCL the angle of incidence: ſo that if CL be ſuppoſed the radius, HL will be the ſine of the angle of incidence, and HK that of the refracted angle; ſo that if HK and HL be carefully meaſured by an exact ſcale of equal parts, you will have in numbers the ratio of the ſines of the angle of incidence to that of the refracted angle. If, inſtead of a cube of glaſs, you uſe a little veſſel of water, or other liquors, you may obſerve the law of refraction in theſe mediums.

Optic Angle, or Angle *of Viſion*, is the angle formed at the bottom of the eye by two rays iſſuing from the extreme points of an object. Thus, the angle ABC, (plate XII. *fig.* 7.) formed by the rays AB, CB, iſſuing from the extreme points A, C, of an object, is the optic angle.

Angle *of the Sun's Poſition* is an angle formed by the meridian, and an azimuth, or other great circle, drawn through the center of the ſun.

Angle *of Longitude* is an angle formed at the pole of the ecliptic between the meridian, and a circle of longitude drawn through the center of the object.

Angle *of the Courſe*, in navigation; ſee Course and Rhumb.

Angle *at the Center*, in fortification, is that formed at the center of the figure, by lines drawn thence to the points of the baſtions. Thus XAQ (plate XII. *fig.* 8.) is an angle at the center.

Angle *of a Baſtion* is the angle IQO, which the two faces IQ and OQ form at the point of the baſtion.

Angle *of the Tenaille* is the angle IXMI, formed before the curtain by the two lines of defence XP and QN.

Diminiſhed Angle is the angle IQX (*fig.* 8.) formed by the line IQ, the face of the baſtion, and XQ the exterior ſide of the polygon.

Re-entering Angle is any angle in a fortreſs, whoſe point turns inwards, or towards the place; that is, whoſe legs open towards the field.

Salient Angle is that which points outwards, or whoſe legs open towards the place.

Angle *of the Polygon* is the angle DXQ, (*fig.* 8.) or XQK, formed by two ſides of the polygon.

Angle *of the Complement of the Line of Defence* is the angle formed by the interſection of the two complements with each other.

Angle *of the Mote* is that formed before the curtain where it is interſected.

Angles *of a Battalion*, in military affairs, are the laſt men where the ranks and files terminate.

ANGLING, the art of fiſhing with a rod, to which are fitted a line, hook, and bait.

The following rules are neceſſary to be obſerved in angling. 1. To place yourſelf ſo that your ſhadow do not at any time fall upon the water, eſpecially if it be ſhallow. 2. To angle in a pond near the ford where cattle go to drink, and in rivers, in ſuch places as the fiſh you angle for uſually frequent; as, for breams in the deepeſt water; for eels under banks; for chub in deep ſhaded holes; for perch and roach in ſcowrs; for trouts in quick ſtreams.

The beſt times for angling are from April to October; for in cold ſtormy weather, or bleak eaſterly winds, the fiſh will not bite. The time of the day, in warm months, is in the morning, about nine o'clock, and in the afternoon between three and four. In order to attract fiſh to the place intended for angling, it will be proper once in four or five days to throw in ſome corn boiled ſoft, garbage, worms chopped to pieces, or grains ſteeped in blood and dried; and, if you fiſh in a ſtream, it will be beſt to throw in the grains above the hook.

The beſt method of angling with a fly is down the ſtream; and, in order to make the fiſh bite freely, be ſure to uſe ſuch baits as you know they are naturally inclined to, and in ſuch a manner as they are accuſtomed to receive them.

The ſeveral methods for angling for ſalmon, trout, carp, tench, perch, pike, dace, gudgeons, roach, flounders, &c. will be found under the articles *Salmon* Fishing, *Trout* Fishing, &c.

ANGLO-SAXON, a name given to the language ſpoken by the Engliſh Saxons, in order to diſtinguiſh it from the true Saxon, and alſo from the modern Engliſh.

ANGONÆUS, in anatomy, a name given to a muſcle of the arm, inſerted into the ancon, or extremity of the elbow.

ANGUILLA, in natural hiſtory, the name by which the writers in that ſcience calls the eel. See Eel.

ANGUINEAL *Hyperbola*, a kind of ſerpentizing hyperbola, cutting its aſymptote with contrary flexions.

Sir Iſaac Newton, in his Treatiſe of Curves, has given this name to the 33, 34, 35, and 36 ſpecies of the ſecond order, and which he has expreſſed by this equation, $xyy.ey = -ax^3.bx^2.ex.d.$

ANGULAR, ſomething relating to, or that hath, angles.

Angular *Motion*, in aſtronomy, is the increaſing or decreaſing angle, formed by two lines drawn from a central body to the apparent places of the two planets in motion.

ANHELATIO, or Anhelitus, among phyſicians, a ſhortneſs of breath, or a difficult and ſmall, but quick, reſpiration, which happens to ſound perſons, eſpecially to valetudinarians, after violent exerciſe.

The word is Latin, and derived from *anhelo*, to pant, or breathe with difficulty.

ANHIMA, in natural hiſtory, the name of a bird, common in Brazil, reſembling a crane in ſome particulars; but differing from that and all other birds by a ſlender horn of a bony ſubſtance, inſerted a little above the origin of its beak: its wings too have each a horn of this kind growing out of the fore-part of the bone. It is larger than a ſwan, and mottled with black, grey, and white; in ſome parts are ſmall ſpots of yellow. See plate XII. *fig.* 9.

ANHINGA, in natural hiſtory, an extremely beautiful water fowl, found in the Brazils, about the ſize of our common duck. Its beak is about an inch and a half in length, and has a row of hooked prickles, both above and below; its neck is long and ſlender, and, together with its head, of a yellowiſh colour; the upper part of the back is brown, ſpotted with yellow; and the breaſt, belly, and thighs, are of a ſilvery white.

ANIL, in botany, the name by which ſome writers call the plant that produces indigo. See the article Indigo.

ANIMA, the ſoul, or principle of life in animals. See the article Soul.

Anima *Mundi*, the ſoul of the univerſe, is, according to ſome, a certain, pure, ætherial ſubſtance, which, being diffuſed through the whole maſs of matter, informs, actuates, and unites the various parts of it into one great, perfect, organical body. Others define it to be an ignific virtue, infuſed into the chaos, and diſſeminated through the whole frame for its conſervation, nutrition, and vivification.

The moderns reject this notion of an anima mundi, as the notion is abſolutely repugnant to experience.

ANIMADVERSION, a term ſometimes uſed to ſignify correction; ſometimes remarks, and ſometimes ſerious conſideration.

The word is Latin, *animadverſio*, and compounded of *animus*, the wind, and *verto*, to turn.

ANIMAL, in natural hiſtory, an organized body, endowed with life and ſpontaneous motion.

Boerhaave defines an animal, reſpecting only the body, not the ſoul, to be an organical body, conſiſting of veſſels and juices; and taking in the matter of its nutriment by a part called a mouth; whence it is conveyed in the inteſtines, into which it has roots implanted, whereby it draws in its nouriſhment after the manner of plants.

According to this definition, an animal is diſtinguiſhed from a foſſil, in that it is an organical body; and from a vegetable by this, that it has its roots within itſelf, and a plant without itſelf.

In effect, the inteſtines of an animal are, in reality, no more than its earth, or the body it adheres to; into which it ſends forth its roots, that is, the lacteal veſſels, which thence draw the matter of its life and increaſe.

The general characteriſtic then of an animal, is to be free and at large with reſpect to the ſubject it derives its nouriſhment from; for every thing is taken in at the mouth, and the mouth does not adhere to any thing: whereas all plants are connected in ſome manner or other to the body, which furniſhes them with food.

Hence it follows, that a fœtus, while it remains in the mother's womb, is a real plant, as being connected by the funiculus umbilicalis to the placenta, and by the placenta to the uterus, from whence it receives its nouriſhment.

If it did not derive its food by the ſaid funiculus, but by its mouth, it were an animal, and if it drew it by both, a neophite, or plant-animal.

Some have defined animals from their local motion, as being capable of ſhifting from place to place, and plants from ſticking faſt to the ſame ſubject: but on this principle, oyſters, muſcles, cockles, &c. are excluded from the claſs of animals, inaſmuch as they adhere or grow to rocks, &c. yet it is certain that thoſe creatures are real animals, as they have mouths and ſtomachs to take in their food; and lacteals, meſentery, and veins to receive it.

According to Dr. Tyſon, the criterion of an animal is the ductus alimentalis, i. e. a gullet, ſtomach, and inteſtines; all which make but one continued canal.

All animals, according to the moſt probable and received opinion, are produced originally from eggs, in which they are contained, till the ſeed of the male penetrate their covering and ſtretch them, ſo as they become ready for hatching.

When the animal breaks looſe from its ſhell in its perfect form, we ſay the dam of it is viviparous; when the young is excluded with hard covering round it, which we call the ſhell, we ſay the dam is oviparous. The ſhell of the egg in the oviparous kind is hard and convexed, the better to reſiſt the preſſure and the injuries of the air, to which it muſt lye expoſed for ſome time.

All animals that are found with feet, fins, or wings, and have the free power of tranſporting themſelves from one place to another, are divided into two ſexes under each ſpecies, that they may confer their joint offices in rearing their young. On the other hand, thoſe animals which are confined all their life to one ſpot are hermaphroditical, or have both ſexes conjoined in one body, and procreate their ſpecies without the concurrence of a mate. Of this ſort are limpets, ſea-ears, and ſeveral other kinds of ſhell-fiſh.

The philoſophers comprehend man under the ſpecies of animals, and define him a reaſonable animal: though among naturaliſts, &c. animals are uſually reſtrained to irrationals.

Animals may be conſidered either as aerial, terreſtrial, aquatic, or amphibious. We call thoſe aerial which have wings, with which they can ſupport themſelves in the air.

Terreſtrial are thoſe whoſe only place of reſt is upon earth. Aquatic are thoſe whoſe conſtant abode is upon the water.

Thoſe are called amphibious which live freely in the air upon the earth, and yet are obſerved to live long on the water, as if they were natural inhabitants of that element.

Aerial animals may be ſubdivided into birds and flies. Fiſhes, which are the chief part of aquatic animals, may be divided into ſhell-fiſhes, ſcaly fiſhes, and thoſe that have neither apparent ſcales nor ſhells.

And terreſtrial animals may be divided into quadrupedes, or beaſts; reptiles, which have many feet, and ſerpents which have no feet at all.

Inſects, which in their ſeveral changes belong to ſeveral of the before-mentioned diviſions, may be conſidered together as one great tribe of animals. They are called inſects, from a ſeparation in the middle of their bodies, whereby they are as it were cut into two parts, which are joined together by a ſmall ligature, as we ſee in waſps, common flies, and the like.

Beſides all theſe, there are ſome animals that are not perfectly of theſe kinds, but placed as it were in the middle betwixt them, by having ſomething of both; as beaſts and birds in them.

The greateſt part of animals have five ſenſes, viz. ſeeing, hearing, ſmelling, taſting, and feeling. Some reptiles of the earth, and ſome of the aquatics, want one or more of the ſenſes which are in perfect animals, as worms, oyſters, cockles, &c.

One would wonder to hear ſceptical men diſputing for the reaſon of animals, and telling us it is only our pride and prejudices that will not allow them the uſe of that faculty. Reaſon ſhews itſelf in all occurrences of life: whereas the brute makes no diſcovery of ſuch a talent, but in what immediately regards his own preſervation or the continuance of his ſpecies. Animals, in their generation, are wiſer than the ſons of men; but their wiſdom is confined to a few particulars, and lies in a very narrow compaſs. Take a brute out of his inſtinct, and you find him wholly deprived of underſtanding.

Animals conſiſt of ſolids, or firm parts, as fleſh, bones, membranes, &c. and fluids, as blood, &c.

The ſolids are mere earth, bound together by ſome oily humour; and accordingly are deducible by fire into ſuch earth again.

Thus a bone, being perfectly purged of its moiſture by calcination, is found a mere earth, which the leaſt force will crumble into duſt, for want of the natural gluten; yet the ſame bone, by immerging it in water or oil, becomes firm and ſtrong again, and more ſo in oil than water. And thus cupels will ſuſtain the utmoſt effects of fire.

The parts of animals are diſtinguiſhed from thoſe of vegetables by two circumſtances: the firſt, that when burnt they are found perfectly inſipid, all animal ſalts being volatile, and flying off with heat; the contrary of this is found in vegetables, which conſtantly retain ſome fixed ſalt in all their aſhes.

The ſecond, that no true acid is contained in any animal juice; nor can any acid ſalt be extracted from the ſame; the contrary of which is found in all vegetables.

Yet are animals reconverted into their vegetable nature by putrefaction.

Animals make the ſubject of that branch of natural hiſtory called zoology.

The ſtructure of animals, with their diſorders, remedies, &c. make the ſubject of anatomy, medicine, &c.

As to the ſtructure of animals, it is obſerved that the make of every kind of animal is different from every other kind; and yet there is not the leaſt turn in the muſcles or twiſt in the fibres of any one, which does not render them more proper for that particular animal's way of life, than any other caſt or texture of them would have been.

ANIMAL, uſed adjectively, ſignifies ſomething belonging to, or partaking of, the nature of animals.

ANIMAL *Oeconomy*. See OECONOMY.

ANIMAL *Oil*. See the article OIL.

ANIMAL *Secretion*, the ſeparation of the ſeveral juices of the body from the blood. See SECRETION.

ANIMAL *Spirits*, a very ſubtile fluid ſuppoſed to be ſeparated from the brain, and thence diffuſed into all parts of the body for the performance of all animal and vital functions. See the article SPIRIT.

ANIMALCULE, a minute animal, ſcarce, if at all, viſible to the naked eye.

The word is Latin, *animalculum*, a diminitive of animal.

Animalcules, though ſo very minute as to be only ſeen by the aſſiſtance of the microſcope, are vaſtly more numerous than any other part of the animal creation. They have been diſcovered in moſt liquors, in ſeveral of the chalybeat as well as in common water: in oats, barley, wheat, peas, &c. and in the puſtules of the itch.

ANIMATED, ſomething inſpired with life, or that exhibits marks of being inſpired by ſome ſpirit or ſoul.

ANIMATED *Power*, in mechanics, implies a man, or other animal, in contradiſtinction to ſprings, water, wind, &c.

ANIMATED *Needle*, one touched with a loadſtone, or magnet. See MAGNET.

ANIME, or *Gum* ANIME, in natural hiſtory, is a kind of gum, or rather reſin, of a friable ſubſtance, inflammable, and ſoluble in oil. There are two kinds of this gum-reſin, diſtinguiſhed by the epithets of oriental and occidental.

The oriental or Ethiopian anime, called by the Portugueſe animum and aniimum, and in the ſhops gum anime, is a dry and ſolid reſin, brought to us in large cakes or maſſes, of an irregular figure, and of a very uncertain colour, ſome of them are greeniſh, ſome reddiſh, ſome brown, and ſome of the colour of myrrh; they all agree in this, however, that they are moderately pellucid, of a tolerable compact texture, light and eaſily powdered, of a fragrant ſmell, very inflammable, and of a reſinous and ſomewhat bitter taſte. This, which is the genuine and true anime, is now very rare in the ſhops. It is brought, as Garcias informs us, only from Ethiopia; but the occidental kind, or reſin of the courbaril, is what is univerſally received in its place. It has been ſuppoſed by many, that this Ethiopian or true anime was known to the ancient Greeks. Some have ſuppoſed that Dioſcorides meant this reſin by the name of myrrha minia; and many arguments have been advanced in favour of the opinion: but the reſins themſelves are ſo like one another, and the deſcriptions the Greeks have left us of them is ſo ſhort and imperfect, that it is impoſſible to affirm any thing on this head with any tolerable degree of certainty. We are not yet informed what the tree is that produces the Ethiopian anime. Herman is of opinion, that it is the ſame that yields the occidental kind, only growing in a different climate; but this is no more than a conjecture.

The occidental anime is a whitiſh, dry, and ſolid reſin, ſomewhat reſembling frankincenſe in colour. It is often of a fine yellowiſh white, between that of frankincenſe and maſtich, and in the pureſt pieces is very clean and tranſparent; in general, however, it is much inferior to the oriental in theſe reſpects. It is moderately heavy, friable, and ſomewhat oleaginous to the touch. It is extremely fragrant, eſpecially when burnt, and is of a reſinous, acrid, and ſomewhat bitteriſh taſte. It is brought to us from many parts of America, particularly from New Spain and the Braſils. The natives call it jeticacica and jetaicica. Our people, from their name of the tree, vulgarly call it reſin of courbaril.

Whatever might be the caſe in regard to the Ethiopian anime, we may be very well aſſured, that this was not known to the Greeks. The tree which produces it is one of the arbores ſiliquoſæ of Mr. Ray. It is deſcribed by Caſpar Bauhine, under the name of arbor ſiliquoſa ex Virginia lobo fuſco ſcabro; and by Plumier, under that of courbaril bifolia flore pyramidato. It grows to a very great height; its wood is ſolid, and of a fine grain, of a reddiſh colour, and very durable, and ſerves them for many of their better works. The leaves are like thoſe of our bay-tree, but thicker, and they grow conſtantly two together on every ſtalk; they are of a ſhining green, and, if held up to the light, ſeem to be perforated with innumerable little holes in the manner of the leaves of St. John's-wort. The flowers ſtand in cluſters or tufts towards the tops of the branches; they are of the papilionaceous kind, like thoſe of our vetches, and of a purpliſh colour; they are ſucceeded by a kind of pods ſix inches long, and an inch and a half broad, compreſſed ſideways, and raiſed into two ridges on the back. The fruit, when ripe, does not open lengthways into two halves, as the generality of pods of this ſhape do; it remains entire, and contains in it, among a multitude of irregular fibres, four or five ſeeds larger than the common pine-kernels, otherwiſe like them. This tree is common in moſt parts of America; and the fruit ripens in May and June, when it falls from the trees, and is picked up by the natives, who are fond of the farinaceous ſubſtance that is among the fibres within. The trunk of the tree exſudates the reſin here deſcribed in very conſiderable quantities, without being wounded for it; the fineſt lumps of it are white, or of a pale yellow, and much reſemble amber.

Anime, in heraldry, a term uſed when the eyes of any rapacious creature are borne of a different tincture from that of the creature itſelf.

ANINGA, in commerce, the name of a root growing in the Antilles iſlands, nearly reſembling the china root. It is uſed in the ſugar works for refining the ſugar.

ANISE, *Aniſum*, in botany, a ſmall annual umbelliferous herb, producing roundiſh ſtriated ſeeds, flatted on one ſide, and pointed at one end; of a pale colour inclining to green. The upper leaves are divided into five ſegments; but the lower are entire, roundiſh, and ſerrated about the edges.

This plant, which is ſaid to be a native of Egypt and Syria, is cultivated in the ſouthern parts of Europe. It is alſo raiſed in ſome of our gardens, but ſeldom brings its ſeed to perfection. The ſeed brought from Spain are reckoned the beſt.

Anniſeeds have an aromatic ſmell, and a pleaſant warm taſte, accompanied with a ſmall degree of ſweetneſs. They are in common uſe as a warm carminative, and ſuppoſed to be the moſt effectual of all the warm ſeeds.

They give out all their virtue to rectified ſpirits, which become of a bright lemon colour, and taſte very agreeably. Infuſed in water they impart a little of their ſmell, but ſcarcely any taſte: in diſtillation they give over the whole of their flavour, the remaining decoction having neither the ſmell nor the taſte of the anniſeeds.

An eſſential oil ariſes with the water, in a conſiderable quantity, above an ounce having been extracted from three pounds of the ſeed. This oil is of a yellowiſh colour, and congeals into a butyraceous white concrete, even when the air is not ſenſibly cold. Its ſmell, which exactly reſembles that of the anniſeeds, is extremely durable and diffuſive; and its taſte milder, and leſs pungent than that of almoſt any other diſtilled vegetable oil. It is recommended chiefly in diſorders of the breaſt; but is ſaid to be leſs effectual in flatulencies, than the ſeeds in ſubſtance.

Anise *Stellatum*, ſtellated aniſe, is the fruit or ſeed veſſel of a ſmall tree growing in Tartary, China, and the Philippine iſlands. It conſiſts of ruſty brown coloured hard wrinkled capſules, about half an inch in length, joined together by baſes, to the number of ſix or more, in the form of a ſtar; each of which include one ſeed or kernel, gloſſy, and of the colour of linſeed externally, and white internally.

The huſks have a fragrant ſmell, and a ſweetiſh warm aromatic taſte, reſembling thoſe of the common anniſeeds, but ſtronger and more agreeable. They have alſo the ſame virtues, and might be given with advantage in the ſame intentions.

ANKER, a liquid meaſure at Amſterdam, containing about thirty-two gallons Engliſh.

ANNALES, a ſpecies of hiſtory, wherein events are related in the chronological order they happened.

It differs from a perfect hiſtory, in being only a meer relation of what paſſes every year, as a journal is of what paſſes every day; whereas hiſtory relates not only to the tranſactions themſelves, but alſo the cauſes, motives, and ſprings of ſuch actions. Annales require brevity only; hiſtory demands ornament.

Cicero informs us that the pontifex maximus, in order to preſerve the memory of events, wrote what paſſed each year on tablets, which were expoſed to public inſpection in his own houſe. Theſe tablets were called *annales maximi*; and hence the writers who imitated this ſimple method of writing were ſtiled annaliſts.

ANNATES, among eccleſiaſtical writers, implies the firſt year's revenue of a ſpiritual living.

Theſe annates were formerly given to the pope; but at the reformation they were veſted in the king. Queen Anne, however, reſtored them to the church, by appropriating them to the augmentation of ſmall livings.

ANNEALING, or Nealing, an operation performed on glaſs, earthen-ware, &c. in a particular oven or furnace erected for that purpoſe. See the article Nealing.

Annealing *of Glaſs, Iron, Steel, &c.* See Glass, Iron, Steel, &c.

ANNE, or *St.* Anne's *Day*, a feſtival obſerved in the Greek and Latin churches, in honour of Anne or Anna, mother of the Virgin Mary. It is celebrated by the former on the ninth of December, and by the latter on the twenty-ſixth of July.

ANNEXATION, in law, implies the uniting lands or rents to the crown.

ANNI *Nubiles*, in law, ſignifies the marriageable age of a woman, viz. after ſhe has reached her twelfth year.

ANNIENTED, in law, imports annulled or made void.

ANNIHILATION, the act of reducing any created being to nothing, and ſtands oppoſed to creation.

The word is formed from the Latin, *ad*, to, and *nihilum*, nothing.

ANNIVERSARY, the annual return of any remarkable day.

The word is formed from the Latin, *annus*, a year, and *verto*, to turn.

Formerly anniverſary days particularly denoted thoſe days on which an office was performed for the ſouls of the deceaſed, or the martyrdom of the ſaints was celebrated in the church.

ANNO DOMINI, the year of our Lord, the computation of time from our Saviour's incarnation. See Epocha.

ANNOMINATION, in rhetoric; ſee Paronomasia.

ANNOTATION, in matters of literature, a brief commentary, or remark on a book or writing, in order to clear up ſome paſſage, or draw ſome concluſion from it.

Annotation, among phyſicians, implies the beginning of a febrile paroxyſm, when the patient begins to ſhiver, yawn, and ſtretch.

ANNOTTO, in dying, an elegant red colour, formed from the pellicles of the ſeeds of a tree common in South-America. It is alſo called orlean, and roucou.

The manner of making annotto is as follows: The red ſeeds, cleared from the pods, are ſteeped in water for ſeven or eight days or longer, till the liquor begins to ferment; then ſtrongly ſtirred, ſtamped with wooden paddles and beaters, to promote the ſeparation of the red ſkins: this proceſs is repeated ſeveral times till the ſeeds are left white. The liquor, paſſed through cloſe cane ſieves, is pretty thick, of a deep red colour, and a very ill ſmell: in boiling, it throws up its colouring matter to the ſurface in form of ſcum, which is afterwards boiled down by itſelf to a due conſiſtence, and made up while ſoft into balls.

The annotto, commonly met with among us, is moderately hard and dry, of a brown colour on the outſide, and a dull red within. It is difficulty acted upon by water, and tinges the liquor only of a pale browniſh yellow colour. In rectified ſpirit of wine, it very readily diſſolves, and communicates a high orange or yellowiſh red. Hence it is uſed as an ingredient in varniſhes, for giving more or leſs of an orange caſt to the ſimple yellows. Alkaline ſalts render it perfectly ſoluble in boiling water, without altering its colour. Wool or ſilk boiled in the ſolution, acquire a deep, but not a very durable, orange dye. Its colour is not changed by alum or by acids, any more than by alkalies; but when imbibed in cloth, it is diſcharged by ſoap, and deſtroyed by expoſure to the air.

Mr. Pott, in the Berlin Memoirs for the year 1752, mentions a very extraordinary property of this concrete: "With the vitriolic acid, it produces a blue colour, of "extreme beauty, but with this capital defect, that all "ſalts and liquors, even common water, deſtroy it." The ſpecimen of annotto which I examined was not ſenſibly acted on by ſpirit of vitriol; it received no change in its own colour, and communicated none to the liquor: nor did any viſible change enſue upon dropping the acid into tinctures of annotto made in water or in ſpirit.

Labat informs us, that the Indians prepare an annotto greatly ſuperior to that which is brought to us, of a bright ſhining red colour, almoſt equal to carmine: that, for this purpoſe, inſtead of ſteeping and fermenting the ſeeds in water, they rub them with the hands, previouſly dipt in oil, till the pellicles come off and are reduced into a clear paſte, which is ſcraped off from the hands with a knife, and laid on a clean leaf, in the ſhade, to dry. De Laet, in his notes on Marcgrave's Natural Hiſtory of Brazil, mentions alſo two kinds of annotto; one of a permanent crimſon colour, uſed as a fucus, or paint for the face; and another, which gives a colour inclining more to that of ſaffron. This laſt, which is our annotto, he ſuppoſes to be a mixture of the firſt ſort, with certain reſinous matters, and with the juice of the root of the tree. *Lewis's Notes upon Neumann's Chemiſtry.*

ANNUA *Penſione*, in law, an old writ for granting an annual penſion to one of the king's chaplains.

ANNUAL, in a general ſenſe, is an epithet applied to any thing that returns every year, or that is performed in that ſpace of time.

Annual *Equation*, in aſtronomy; ſee the article Equation.

Annual, or rather Annuel, in the Scottiſh law, implies a yearly revenue or rent, payable at the two great terms Whitſuntide and Martinmas.

ANNUENTES *Muſculi*, in anatomy; ſee the article Recti *Interni minores.*

ANNUITY, a yearly rent or revenue, paid either for term of life, or of years, or in fee, and for ever.

In common law, the difference between a rent and an annuity, conſiſts in this, that rent is payable out of land; whereas an annuity charges only the perſon of the grantor; and that, for the recovery of a rent, an action lies: whereas for that of an annuity, there only lies a writ of annuity againſt the grantor, his heirs and ſucceſſors. Add, that annuities are never taken for aſſeſts, as being no freeholds in law.

For the computation of the value of annuities in arrears on lives, in perpetuity, &c. See Interest *Simple* and *Compound.*

ANNULAR, in a general ſenſe, implies ſomething in the form of a ring.

The word is formed from the Latin, *annularis*, and derived from *annulus*, a ring.

Annular, in anatomy, is an epithet applied to ſeveral parts of the human body; thus the ſecond cartilage of the larynx is called the annular cartilage; the ligament that encompaſſes the wriſt, and ties the bones together, is termed the annular ligament; and a protuberance of the medulla oblongata is ſtiled the annular proceſs.

Annular is alſo a peculiar name for the fourth finger.

ANNULET, in architecture, ſignifies a ſmall ſquare member in the Doric capital, under the quarter round. See Capital.

Annulet is alſo uſed to imply a narrow flat moulding, common to various parts of the columns, particularly their baſes, capitals, &c. Vitruvius calls it a fillet; Palladio, a liſtel or cincture; Scamozzi, a ſupercillium, liſt, tinea, eye-brow, ſquare, and rabbit. Such confuſion have artiſts made by calling the ſame member by different names.

Annulet, in heraldry, is a mark of diſtinction proper to the fifth brother of a family.

ANNULLING, a term ſometimes uſed for cancelling, or rendering a deed, ſentence, &c. void, and of no effect.

ANNUNCIADA, an order of knighthood in Savoy, originally inſtituted by Amadeus I. in the year 1409, and called by the founder, the knot of love. The collar conſiſted of fifteen links interwoven with one another, in the form of a true lover's knot; and the motto, F.E.R.T. *fortitudo ejus Rhodum tenuit.* But Amadeus VIII. changed the name to that of Annunciada, and inſtead of the image of St. Maurice, which was appended to the collar, placed that of the Virgin Mary. At the ſame time he ſubſtituted the words of the angel's ſalutation, inſtead of thoſe in the above motto.

ANNUNCIADES, ſeveral religious orders inſtituted in honour of the annunciation.

The firſt order of this kind was founded by ſeven merchants at Florence, in 1232. The ſecond was a nunnery at Bourges, founded by Joan, queen of France, after her divorce from Lewis XII. The third was a nunnery founded by a Genoeſe lady in the year 1600. The fourth, a friary, founded by cardinal Torrecremata, at Rome.

ANNUNCIATION, a feſtival celebrated by the church on the twenty-fifth of March, in memory of the annunciation, or tidings, brought by the angel Gabriel to the Virgin Mary, of the incarnation of Chriſt.

The feaſt of this annunciation appears to be of very great antiquity. There is mention made of it in a ſermon, which goes under the name of Athanaſius. Others carry it up to the time of Gregory Thaumaturgus, becauſe there is a ſermon likewiſe attributed to him upon the ſame ſubject. But the beſt critics reject both theſe writings as ſpurious. However, it is certain, this feſtival was obſerved before the time of the council of Trullo, in which there is a canon forbidding the celebration of all feſtivals in Lent, excepting the Lord's day, and the feaſt of the annunciation: ſo that we may date its original from the ſeventh century.

ANODYNE, among phyſicians, ſignifies a medicine that mitigates or removes pain.

The word is compounded of the Greek α, priv. and ὀδύνη, pain.

There are two ſpecies of anodynes, diſtinguiſhed by the epithets proper and improper. The former are ſuch as mitigate the pain by removing the cauſe. The latter that alleviate it for a time by ſtupifying the ſenſes. The proper anodynes are called paregorics; and the improper opiates, and narcotics. See the articles PAREGORICS, OPIATES, and NARCOTICS.

ANOMALISTICAL *Year*, in aſtronomy, ſignifies the time that the earth takes up in paſſing through her orbit, and is generally called the periodical year. See the article YEAR.

ANOMALOUS, in a general ſenſe, is applied to whatever is unequal, irregular, or that deviates from the rule obſerved by ſimilar things in ſimilar caſes.

The word is formed from the Greek, α, priv. and ὁμαλὸς, equal.

ANOMALOUS *Pulſe*, among phyſicians, implies a pulſe whoſe ſtrokes are unequal with regard to ſtrength.

ANOMALOUS *Verbs*, in grammar, are ſuch as are irregularly conjugated, or formed in a manner different from the general rules.

ANOMALY, in grammar, implies an irregularity or a deviation from the common rules.

ANOMALY, in aſtronomy, is the diſtance of a planet from the aphelion or apogee; or it is an irregularity in the motion of a planet, whereby it deviates from the aphelion or apogee.

Kepler diſtinguiſhes three kinds of theſe anomalies; mean, eccentric, and coequate, or true.

Mean ANOMALY, in the old aſtronomy, is the diſtance of a planet's mean place from the apogee.

In the modern aſtronomy, it is the time wherein the planet moves from its aphelion, to the mean place or point of its orbit. Thus, let A O B (pl. XII. *fig.* 10.) be the orbit of a planet *n* revolving therein, about S, the ſun placed in one of the foci, A C the ſemi tranſverſe axis, C O the ſemi conjugate, and *n* the place of the planet at any given time, after or before its paſſing A, the aphelion. Now from *n* draw *n* P perpendicular to A B, and produce P *n* to E in the periphery of the circumſcribing circle A E B *s* A, draw the radius C E, and from S let fall the perpendicular S D upon E C produced, take the arch E H equal to the right line S D, and draw H C; then will A H, the meaſure of the angle A C H, repreſent the mean anomaly of the planet in the point *n*, and is proportional to the time of its moving from A to *n*. To prove this, draw E S and S *n*; then the ſector E C H being equal to the triangle E C S, A C H A will be equal to A E S A; for the former of thoſe areas is compounded of the ſector A C E, and E C H, and the latter of the ſame ſector, and the triangle E C S: wherefore, ſince the area A S E A, is to A E B C A, half the circle, as the elliptical area A *n* S A, to the ſemi-ellipſis A *n* B C A, by a well known relation of the two curves; if, inſtead of A E S A, its equal be ſubſtituted, we ſhall have, as A C H A : A E B A :: A *n* S A : A *n* B A; but A C H A is to A E B A, as the arch A H to A E B, the ſemi-circumference; and therefore it will be as A *n* B A : A *n* S A :: A E B : A H. Wherefore, ſince the areas A *n* B A, A *n* S A, deſcribed by radii drawn to S, the center of force, are as the times of their deſcription, it will be as the time of deſcribing A *n* B A, or that of half one revolution is to the given time of deſcribing A *n* S A, ſo is A E B to A H, which therefore is the mean anomaly in this poſition, or the arch proportional to the time of the planet's moving through A *n*.

ANOMALY *of the Excentric*, or *of the Center*, in the ancient aſtronomy, is an arch of the zodiac, terminated by the line of the apſides, and the line of the mean motion of the center.

In the new aſtronomy, it is an arch A E of the excentric circle A E B, cut off by a right line P *n* E, drawn perpendicular to the tranſverſe diameter A B of the orbit.

ANOMALY *Coequate*, or *True*, is the diſtance of the ſun from his apogæum, or a planet from its aphelium, where it is ſeen from the ſun; that is, it is the angle A S *n* at the ſun, which the planet's diſtance from the aphelium A appears under. Ptolemy calls this *the angle of the true motion*, and ſome *the angle of the ſun*.

It is a difficult, and at the ſame time a very uſeful, problem to find directly the true anomaly from the mean one given; or, which is the ſame thing, to find the poſition of a right line S *n* paſſing through the focus S of a given ellipſis, which ſhall cut off an area *n* S A by its motion, being to the area of the whole ellipſis in a given ratio, viz. in the ratio of the periodic time of a planet deſcribing the ellipſis to another given time; which, being found, the point *n*, or place of the planet at that time will be had.

There are ſeveral methods of ſolving this uſeful problem, which was firſt propoſed by the learned Kepler, though indeed he was never maſter of a direct method of ſolving it, as himſelf expreſly owns; but he did it indirectly by the rule of *Falſe*, as may be ſeen in his *Epitom. Aſtron. Copernic.* Wolfius and Dr. Wallis firſt gave the geometrical ſolution thereof, by means of the protracted cycloid: ſo has Sir Iſaac Newton too in Prop. 31, lib. 1. *Princip. Mathem. Philoſ. Nat.* Theſe are indeed very ingenious, but not adapted for the purpoſe of an aſtronomer; and therefore Sir Iſaac Newton gave other ſolutions by ſeries's; the ſame has been done by Dr. Gregory in his Aſtron. lib. 3. alſo by Dr. Keil in his Prælection, Aſtron. p. 375.

The moſt uſeful and exact method for finding the place of a planet in its orbit, is from a correction of Ward's Hypotheſis, by means of one or more equations applied to the motion about the upper focus. This elegant inveſtigation, as given by that late excellent mathematician Mr. Thomas Simpſon, in his Miſcellaneous Tracts, is as follows.

Let A B P C (pl. XII. *fig.* 11.) be the ellipſis in which the planet revolves about the ſun in the lower focus S; let F be the upper focus, and M and *m* any two places of the planet indefinitely near to each other, and let F M, F *m*, S M, S *m*, be drawn, as likewiſe M N, perpendicular to the greater axis A P: from the center F, with the radius F D $= 1$, let the circumference of a circle D E *e* be deſcribed, and from its interſection with F M draw E H perpendicular to A P: put A O ($=$ O P) $= a$, O B ($=$ O C) $= b$, O F ($=$ O S) $= c$, F M $= u$, F H $= x$, E H $= y$, D E $= z$, and E *e* $= \dot{z}$, then S M being ($=$ A P $-$ F M) $= 2a - u$, by the nature of the ellipſis, and F N ($=$ F H $\times \frac{FM}{FE}$) $= ux$, we have, by a known property of triangles $\overline{SM + FM} \times \overline{SM - FM}$ ($2a \times \overline{2a - u} = 2SF \times ON$ ($4c \times \overline{c + ux}$): from which equation u (F M) is found $= \frac{a^2 - c^2}{a + cx} = \frac{bb}{a + cx}$ (becauſe $bb = aa - cc$): whence S M ($= 2a - u$) is alſo had in terms of x, being $= \frac{aa + cc + 2acx}{a + cx}$.

Now the area E F *e* being expreſſed by $\frac{1}{2}\dot{z}$ ($=$ F E $\times \frac{1}{2}$ E *e*) we have F E^2 (1) : F M^2 :: $\frac{1}{2}\dot{z}$: the area M F *m* $= \frac{1}{2}\dot{z} \times$ F M^2. Therefore, the angle S M *m* being equal to F M A, or F *m* A (by the nature of the curve) we alſo have F M $\times$ M *m* : S *m* $\times$ *m* M (or F M : S M :: the area ($\frac{1}{2}\dot{z} \times$ F M^2) of the triangle F M *m* : the area of the triangle S M *m* $= \frac{1}{2}\dot{z} \times$ F M $\times$ S M (Euc. 23. 6.)

$$= \frac{\frac{1}{2} b^2 \dot{z} \times \overline{a^2 + c^2 + 2acx}}{\overline{a + cx}^2} = \frac{1}{2} b^2 \dot{z} + \frac{\frac{1}{2} b^2 c^2 \dot{z} \times \overline{1 - xx}}{\overline{a + cx}^2}$$

$$= \frac{1}{2} b^2 \dot{z} + \frac{\frac{1}{2} b^2 c^2 y^2 \dot{z}}{\overline{a + cx}^2} = \text{the fluxion of the area ASM.}$$

In order to find the fluent hereof, let $\frac{1}{\overline{a + cx}^2}$ be reſolved into the ſeries $a\frac{1}{2} - \frac{3cx}{a^3}$, and (whereof the two firſt terms will here be ſufficient) by which means our fluxion will become $\frac{1}{2}b^2\dot{z} + \frac{\frac{1}{2}b^2c^2y^2\dot{z}}{a^2} - \frac{b^2c^3xy^2\dot{z}}{a^3}$, which, becauſe $y\dot{z} = -\dot{x}$, and $x\dot{z} = \dot{y}$, will be reduced to $\frac{1}{2}b^2\dot{z} + \frac{b^2c^2}{2a^2} \times -y\dot{x} - \frac{b^2c^3y^2\dot{y}}{a^3}$; whoſe fluent will therefore be truly expreſſed by $\frac{1}{2}b^2z + \frac{b^2c^2}{2a^2} \times$ area DHE $-\frac{b^2c^3y^3}{3a^3}$, or $\frac{1}{2}b^2z + \frac{b^2c^2}{2a^2} \times \overline{\frac{1}{2}z - \frac{1}{2}xy} - \frac{b^2c^3y^3}{3a^3}$ (becauſe the area DHE $= \frac{1}{2}$DE × DF $- \frac{1}{2}$HF × EH $= \frac{1}{2}z - \frac{1}{2}xy$). This expreſſion, when M coincides with P, and z is = the ſemi-circumference DEK (= p) will become $\frac{b^2p}{2} + \frac{b^2c^2p}{4aa} = \frac{b^2dp}{2}$ (ſuppoſing $d = 1 + \frac{cc}{2aa}$) = the area of the ſemi-ellipſis ABP. Therefore we have, as $\frac{b^2dp}{2} : \frac{b^2dz}{2} - \frac{b^2c^2xy}{4aa} - \frac{b^2c^3y^3}{3a^3}$ (= the area ASM) :: p (= the length of an arch of 180°) : $z - \frac{c^2xy}{2a^2d} - \frac{2c^3y^3}{3a^3d}$ = the length of an arch (A) expreſſing the planet's mean anomaly; from which equation, $z = A + \frac{c^2xy}{2a^2d} + \frac{2c^3y^3}{3a^3d} = A + \frac{c^2}{4a^2d} \times \overline{\text{ſin. } 2z} + \frac{2c^3}{3a^3d} + \overline{\text{ſin. } z}^3$ (becauſe xy, or coſine z × ſine $z = \frac{1}{2}$ ſin. $2z$: where the two laſt terms being very ſmall in compariſon of the others (and, therefore, z nearly = A), we may, inſtead of ſin. z and ſin. $2z$, ſubſtitute ſin. A and ſin. 2 A; by which means we have $z = A + \frac{c^2}{4a^2d} \times \text{ſin. } 2A + \frac{2c^3}{3a^3d} \times \overline{\text{ſin. } A}^3$. From whence it appears that, in order to have the angle AFM at the upper focus, the mean anomaly (A) of the planet at the time given, muſt be increaſed by the quantity or correction $\frac{c^2}{4a^2d} \times \text{ſin. } 2A + \frac{2c^3}{3a^3d} \times \overline{\text{ſin. } A}^3$.

But to expreſs the value of this correction in ſeconds of a degree, (which in practice is the moſt commodious) it will be, as 3.1416 (the length of an arch of 180 degrees) is to 648000 (the number of ſeconds in that arch) ſo is $\frac{cc}{4a^2d} \times \text{ſin.} 2A + \frac{2c^3}{3a^3d} \times \overline{\text{ſin. } A}^3$ to $51567 \times \frac{c^2}{a^2d} \times \text{ſin. } 2A + 137513 \times \frac{c^3}{a^3d} \times \overline{\text{ſin. } A}^3$ = the number of ſeconds in the ſaid correction, the logarithm of the latter term of which will therefore be = 5.1383 — log. d + 3 log. $\frac{c}{a}$ + 3 log. ſin. A; and that of the former = 4.7123 — log. d + 2 log. $\frac{c}{a}$ + log. ſin. 2 A. But, to render theſe expreſſions ſtill more convenient for practice, the log. of d, by reaſon of its ſmallneſs, may be either entirely neglected, or elſe ſo aſſumed, to be nearly a mean of what it is known to be in the planetary orbits: accordingly, by aſſuming the excentricity $c = \frac{8}{100}$ of the mean diſtance, (which is a ſmall matter leſs than the excentricity of Mars, but ſomething greater than thoſe of the Moon, Saturn, and Jupiter) the value of d $(= 1 + \frac{c^2}{2aa})$ will be = 1,0032, and its logarithm = 0,0014. Whence the log. of the former part of our correction, by ſubſtituting this value, will be $5.1369 + 3$ log. $\frac{c}{a}$ + 3 log. ſine A $= \overline{3 \times 1.7123 + \text{log.} \frac{c}{a} + \text{log.ſin.A}}$ and that of the latter = 4.7109 + 2 log. $\frac{c}{a}$ + log. ſin. 2 A: which, expreſſed in words at length, give the following

PRACTICAL RULES.

1°. To the ſum of the conſtant logarith 1.7123, and the log. of the excentricity in parts of the mean diſtance, add the log. ſine of the mean anomaly, the ſum (rejecting the radius) being tripled, will give the log. of the firſt equation (in ſeconds) to be added to the mean anomaly.

2°. To the ſum of the conſtant log. 4.7109, and twice the log. of the excentricity, add the log. ſine of twice the mean anomaly, the ſum (rejecting the radius) will be the log. of the ſecond equation, to be added or ſubtracted, according as the mean anomaly is leſs, or greater than 90 degrees.

Here, and in what follows, the anamoly is to be always reckoned from, or to the aphelion, the neareſt way, in which the ſeconds may be omitted in computing the propoſed corrections; which corrections being made, the true anomaly, or angle at the lower focus, will be had from the common proportion, by ſaying, as the aphelion-diſtance is to the perihelion-diſtance, ſo is the tangent of half the mean anomaly thus corrected, to the tangent of half the true anomaly ſought.

As an example of the uſe of the method here laid down, let the excentricity be ſuppoſed = 0.048219 (being that aſſigned by Dr. Halley to the orbit of Jupiter) and let the mean anomaly be 45°.

Then, log. excent. —	$\bar{2}.6832$	2 log. excent.	$\bar{3}.3664$
+ conſt. log. — —	1.7123	+ conſt. log.	4.7109
= log. for 1ſt equ. —	0.3955	=log. for 2d equ.	2.0773
log. ſin. anom. — —	9.8494	log. ſin. 2 anom.	10.0000
	0.2449	2d equ. = 119½″	2.0773
firſt equa. = 5 ½″ —	0.7347		

From 1.978537 = log. of perihelion-diſ. 0.951781
Subſtr. 0.020452 = log. of the aphelion-diſ. 1.048219

the rem. $\bar{1}$.958085 will be a (3d) conſt. log for this orbit, to which add 9 617596 = log. tang. ½ cor. anom. 22°. 31′. 2½″ ſo ſhall 9.575681 = log. tang. ½ true anom. 20°. 37. 40″ whoſe double 41°. 15′. 20″. is therefore the true anomaly required.

The ſame excentricity being retained, let the mean anomaly be now ſuppoſed 120 degrees.

Then, log. ſin. anom.	9.9375	log. ſin. 2 anom.	9.9375
log. for firſt equation	0.3955	log. for 2d equat.	2.0773
	0.3330	2d equat. = 103½″	2.0148
firſt equat. = 10″	0.9990		

Hence 120° + 10″ − 1′ 43½″ = 119° 58′ 26½″. = the cor. anomaly.

Therefore log. tang. ½ cor. anom. 59° 59′ 13¼″ 10.238331
+ third conſt. log. for this orbit — — — 1.958085
= log. tang. ½ true anom. 57° 32′ 10″ — 10.196416
Whence the anomaly itſelf is given = 3^s. 25°. 4′. 20″.

If the excentricity be aſſumed = 0.066777 (being the greateſt that Dr. Halley gives to the lunar orbit) the two conſtant logarithms, to be added to the ſines of the mean anomaly and of its double, will be 0.5369 and 2.3601: whence, if the ſaid anomaly be taken = 50° (at which, according to the Doctor's Table, *pro expediendo calculo æquationis centri lunæ*, the whole correction is a maximum) the former part of the ſaid correction will be found = 18⅘″, and the latter part = 225⅕″: therefore the ſum of both is 244″, or 4′, 4″, agreeing exactly with the quantity given in the table. And in the very ſame manner the proper corrections correſponding to other anomalies and excentricities may be computed; the error never amounting to above a ſingle ſecond in any of the planets, except Mars and Mercury: in the place of Mars, the greateſt error will be two or three ſeconds; and in that of Mercury about as many minutes. As to the Earth and Venus, the ſecond equation alone will be ſufficient to give their places to leſs than a ſecond.

ANOMOEANS, in eccleſiaſtical hiſtory, the name by which the pure Arians were diſtinguiſhed in the fourth century, in contradiſtinction to the Semi-Arians.

The word is formed from the Greek, ἀνόμοιος, different, diſſimilar: for the pure Arians aſſerted, that the ſon was of a nature different from, and in nothing like, that of the father: whereas the Semi-Arians acknowledged a likeneſs of nature in the ſon; at the ſame time that they denied, with the pure Arians, the conſubſtantiality of the word.

The Semi-Arians condemned the Anomæans in the council of Seleucia, and the Anomæans in their turn condemned the Semi-Arians in the councils of Conſtantinople and Antioch, eraſing the word ομοῖος, like, out of the Formula of Rimini, and that of Conſtantinople.

ANONA, in botany, the name of a genus of plants, whoſe perianthum is compoſed of three cordated, hollowed, and ſharp-pointed leaves; the ſtamina are ſcarce viſible; but the antheræ numerous: the fruit is a large berry, of an oval figure, covered with a ſquamoſe punctuated bark: the ſeeds are numerous, hard, of an oblong figure, and placed circularly.

ANONIS, *Reſt Harrow*, in botany, the name of a plant, whoſe roots are above a foot long, creep every way, and not eaſily broken. The ſtalks, which lie on the ground, are ſlender, tough, reddiſh, hairy, and full of prickles; they are beſet with roundiſh leaves, placed three together alternately, ſlightly crenated, hairy, of a dark green colour, and glutinous to the touch. The flowers are papilionaceous, of a light purple, or fleſh colour, and grow in ſpikes at the top of the branches. The piſtil is near a quarter of an inch long, and conſiſts of one bivalved flat capſule, containing a ſingle ſeed in the ſhape of a kidney.

Reſt harrow is accounted deterſive, good to open obſtructions of the liver, and to cure the jaundice. Some affirm it is a diuretic, and proper in ſuppreſſion of the urine; but it is at preſent rarely uſed.

ANONYMOUS, ſomething without a name.

The word is Greek, ανωνυμος, and compounded of α, priv. and ονομα, a name.

It is generally applied to ſuch books as are publiſhed without the name of the author; and to ſuch authors whoſe names are unknown.

ANOREXY, among phyſicians, implies a want of appetite, or a loathing of food.

The word is Greek, ανορεξια, and compounded of α, priv. and ορεγομαι, to covet or deſire.

The anorexy is either an eſſential diſeaſe, proceeding from a fault in the ſtomach, or derived from other diſorders. When it is an original diſeaſe, it generally proceeds from a voraciouſneſs, and a hard diet; whence crude and undigeſted humours will ariſe and prevent digeſtion; which is often known from a ſenſe of weight in the ſtomach, or from copious wind and eructations of various kinds, chiefly the nidorous and acid; or from a nauſea and reaching to vomit. In old perſons, when the whole body is feeble, it may proceed from want of ſpirits, or the fluids being defective, or from a debility of the contractive force and motions of the ſtomach, whence an univerſal decay proceeds.

This diſorder is often a ſymptom of other diſeaſes, particularly the acute, as inflammations, aſthma, dropſy, hypochondriac paſſion, melancholy, the gout, vomiting, or dyſentery; or when the humours are ſo corrupt, and the ſpirits ſo oppreſſed in malignant diſeaſes, that the faculty of digeſtion is depraved, or nature may be ſo buſied in expelling another diſeaſe, as to neglect this. In the laſt caſe it cannot be cured till the diſeaſe itſelf is vanquiſhed.

In the ſpontaneous anorexy, when the ſtomach is loaded with crudities, which cauſe a reaching to vomit, a ſingle emetic will often perform a cure, joined to a ſtomachic remedy: but if there is no reaching, the humours are to be incided and digeſted with bitter ſalts, ſuch as the ſalts of bitter herbs, tartar vitriolated, arcanum duplicatum, or the like, given in powder from a ſcruple to half a dram, ſeveral times in a day; or terra foliata tartari, diſſolved, to ſixty drops or more. After this the cathartic, compoſed of bitter ingredients, or Epſom ſalt, may be given.

When the ſtomach and inteſtines are purged, bitter elixirs and tinctures ſhould be uſed, combined with aromatics, from fifty to ſixty drops, or upwards, to reſtore the tone of the ſtomach. Candied ginger, orange-peel, or elixir vitrioli, eſpecially when the peccant humour is alkalious or bilious, may be properly added to the infuſions of bitter roots and herbs, with aromatics in wine, eſpecially wormwood wine, and the like ſtomachic liquors.

When the crudities of the ſtomach are acid, abſorbents are proper, ſuch as crabs eyes, mother of pearl and coral, and then a ſuitable purge of aloetic pills or rhubarb, or a bitter cathartic ſalt. Magneſia alba is likewiſe uſeful on this account, being abſorbent and uſeful in the hypochondriac paſſion. This ſhould be taken for ſome days, from fifteen to twenty grains; if the doſe be enlarged to a dram or two, it will purge pretty briſkly. The crudities being evacuated, bitters and aromatics are proper, as well as chalybeates and tinctures of ſteel; ſpa waters, and other mineral waters of the ſame kind, together with exerciſe, and now and then a draught of generous wine will be found very advantageous. Smoaking tobacco frequently is hurtful, as well as drinking of drams; the diet ſhould be regular, and the patient muſt avoid aliments that are hard of digeſtion, fat, or flatulent, and alſo intenſe ſtudies.

ANSÆ, in aſtronomy, implies the parts of Saturn's ring projecting beyond the diſk of the planet. See the article SATURN.

The word is Latin, and properly ſignifies handles; theſe parts of the ring appearing like handles to the body of the planet.

ANSER, the gooſe, in natural hiſtory; ſee the article GOOSE.

ANSES, in aſtronomy, the ſame with anſæ. See ANSÆ.

ANT, *Formica*, in natural hiſtory, the name of a well-known inſect, celebrated both for its induſtry and œconomy.

The ſight of ants is really very inſtructive. They are a little people united, like the bees, in a republic governed by its own laws and politics. They have a kind of oblong city, divided into various ſtreets, that terminate at different magazines. Some of the ants conſolidate the earth, and prevent its falling in, by a ſurface of glue with which they incruſt it. Thoſe which we commonly ſee, amaſs ſeveral ſplinters of wood, which they draw over the tops of their ſtreets, and uſe them as rafters to ſuſtain the roof; and acroſs theſe they lay another rank of ſplinters, and cover them with a heap of dry ruſhes, graſs, and ſtraw, which they raiſe with a double ſlope, to turn the current of the water from their magazines; ſome of which are appropriated to receive their proviſions, and in the others they depoſit their eggs, and the worms that proceed from them.

As to their proviſions, they take up with every thing eatable, and are indefatigable in bringing home their ſupplies. You may ſee one loaded with the kernel of ſome fruit, another bends under the weight of a dead gnat. Sometimes ſeveral of them are at work on the carcaſe of a May-fly, or ſome other inſect. What cannot be removed they eat on the ſpot, and carry home all that is capable of being preſerved. The whole ſociety is not permitted to make excurſions at random: ſome are detached, as ſcouts, to get intelligence; and, according to the tidings they bring, all the community are upon the march, either to attack a ripe pear, a cake of ſugar, or a jar of ſweet-meats; and, in order to come to this jar, they leave the garden, and aſcend the houſe; there they find this mine of ſugar, this rich Peru of ſweets, that opens all its treaſures to their view. But their march to it, as well as their return from it, is under ſome regulation: the whole band is ordered to aſſemble and move in the ſame track; but the injunction is not executed with much ſeverity, and they have liberty to expatiate when they have an opportunity to ſpring any game in the country. The green vermin that make an infinite waſte among flowers, and cockle the leaves of the peach and pear trees, are ſurrounded with a glue, or kind of honey, which is ſought for by the ants with great avidity; but they are not ſollicitous either for the fleſh of theſe creatures, or for any part of the plant. Theſe are the vermin who are the authors of all that deſtruction to our trees, which is falſely imputed to the ants, and draws upon them a very unjuſt and cruel perſecution.

Their next prevailing paſſion is to amaſs a ſtore of proviſions that will keep; and, leſt the humidity of the cells ſhould make the corn ſhoot up, we are told that they gnaw off the buds which grow at the point of the grain. But this ſeems to be a vulgar error; though all the ancients mention it; and Aldrovandus aſſures us he had ſeen it. Their labours, as well as their inclinations, may indeed vary according to their ſpecies. And it is likewiſe probable that their aurelias, which are ſometimes yellow, have been taken for grains of corn without buds, and ſwelled by moiſture.

The ants, after they have paſſed the ſummer in a conſtant employment and fatigue, ſhut themſelves up in the winter, and enjoy the fruits of their labour in peace; however, it is very probable, they eat but little in that ſeaſon, and are either benumbed, or buried in ſleep, like a multitude of other inſects; and therefore their induſtry in ſtoring up proviſions is not ſo much intended to guard againſt the winter, as to provide, during the harveſt, a neceſſary ſuſtenance for their young. They nouriſh them, as ſoon as they leave the egg, with an aſſiduity that employs the whole nation; and the care of their little progeny is eſteemed a matter of importance to all the ſtate.

When the young quit the egg, they are little worms, no longer than common grains of ſand, and after they have for ſome time received their aliment, which is brought to them in common, and diſtributed in equal proportions, they ſpin a thread, and wrap themſelves up in a white web, and ſometimes in one that is yellow; at which period they ceaſe to eat, and become aurelias. In this ſtate, ſome people fancy they are the eggs of ants, when in reality they are the nymphs, out of whoſe ruins the new piſmires are to riſe. Though the young diſcontinue their eating, their nurture ſtill proves very fatiguing to their parents. Theſe have generally ſeveral apartments, and remove their young from the nurſery to ſome other manſion they intend to people. They either raiſe the aurelias toward the ſurface of the earth, or ſink them to a diſtance from it, in proportion as the ſeaſon is either warm or cold, rainy or dry. They raiſe them when the weather proves ſerene, or when a long drought is ſucceeded by gentle dews; but, at the approach of night and cold, or the appearance of ſhowers, they claſp their beloved charge in their arms, and deſcend with them to ſuch a depth, that one muſt then dig above a foot into the earth before thoſe aurelias can be diſcovered.

If a mouſe, frog, or other like animal be placed in an ant-hill, he will be devoured, in a few days, to the bones and ligaments. Hence we are furniſhed with a method of obtaining ſkeletons of thoſe animals, exquiſitely beautiful and perfect, far ſurpaſſing any thing that can be executed by artificial anatomy. The ſubject is for this purpoſe to be incloſed in a wooden box, and properly diſtended, to prevent the parts from collapſing or being cruſhed together by the earth. The box is to be perforated with a number of holes, through which the inſects will preſently find their way.

ANT-EATER, in natural hiſtory, the name of an American quadruped that lives upon ants.

This creature is as long and as tall as a middle ſized dog; his hind legs reſemble thoſe of the bear; but his fore legs are more ſlender. His fore feet are flat, and divided into four toes, armed with long claws; but thoſe behind have five toes. His head is long, with a ſharp prominent ſnout, ſmall round black eyes, and very black ears. Thoſe that have meaſured the tongue, affirm, that they have found it upwards of two feet in length, but very ſlender: he is obliged to bend part of it back when he keeps it within his mouth, the jaws being too ſhort to contain it without this artifice.

He lives upon ants, as was obſerved above, and when he has found out one of their neſts, he opens the upper part of it with his claws, that he may have room to put in his ſnout and tongue. This is beſmeared with a ſlimy liquor, and is ſoon covered with ants, when he draws it into his mouth and ſwallows them. He repeats this practice as long as they will run into the ſame ſnare.

The tail of this creature is very remarkable, and in ſome meaſure reſembles that of the fox. It is generally two feet in length, almoſt flat, and covered on all ſides with hair, from fifteen to twenty inches long: it is a little harſh, which gives it ſomewhat the appearance of a horſe's tail; is very ſtrong, and he can move it juſt as he pleaſes; when he turns it upon his back, it entirely covers it, and defends the creature from the rain, which he greatly diſlikes.

ANT-BEAR, the ſame with ant-eater deſcribed in the preceding article.

ANT-HILLS, in huſbandry, are little hillocks of earth which the ants throw up for their habitation for the breeding their young. They are a very great miſchief to dry paſtures, not only by waſting ſo much land as they cover, but by hindering the ſcythe in mowing the graſs, and yielding a poor hungry food pernicious to cattle.

The manner of deſtroying them is to cut them into four parts from the top, and then dig into them ſo deep as to take out the core below, ſo deep that, when the turf is laid down again, it may lie ſomewhat lower than the level of the reſt of the land; and this will prevent the ants from returning to the ſame place, which otherwiſe they would certainly do. The earth that is taken out muſt be ſcattered to as great a diſtance as may be, otherwiſe they will collect it together and make another hill juſt by.

The proper time for doing this is winter, and, if the places be left open, the froſt and rains of that time of the year will deſtroy the reſt; but in this caſe care muſt be taken that they are covered up early enough in the ſpring, otherwiſe they will be leſs fertile in graſs than the other places.

In Hertfordſhire they uſe a particular kind of ſpade to this purpoſe. It is very ſharp, and formed at the top into the ſhape of a creſcent; ſo that the whole edge makes up more than three fourths of a circle: this cuts in every part, and does the buſineſs very quickly and effectually: others uſe the ſame inſtruments that they do for mole-hills.

Human dung is a better remedy than all theſe, as is proved by experiment; for it will kill great numbers of them, and drive all the reſt away, if only a ſmall quantity of it be put into their hills.

ANTA, in ancient architecture, a ſquare pilaſter, placed at the corners of the buildings.—Le Clerc uſes the term to ſignify a kind of ſhaft of a pillar, without baſe or capital, and even without any moulding.

ANTA, in natural hiſtory, the name of an animal common in Brazil, and called tapierete.

It is as large as a calf, but reſembles a hog in ſhape, eſpecially the head, which terminates in a point on the upper part. It has a proboſcis over the mouth, which it can contract or extend at pleaſure. The eyes are ſmall, and like thoſe of a hog, but thicker. The fore feet have four toes, three of which are large, and the other ſmall; but the hind feet only three. It has no tail; and the ſkin is hard: and, while the animal is young, it is covered with ſhort hair of a darkiſh colour, variegated with white ſpots; but when it has done growing, the colour is yellow, and without ſpots. It feeds chiefly in the night, on graſs, ſugar canes, cabbages, and the like. The fleſh has a taſte like beef, but not very agreeable.

The Indians make a ſort of helmets of their ſkins, which cannot be penetrated with an arrow.

ANTAGONIST *Muſcles*, in anatomy, are thoſe which have oppoſite functions, as flexors and extenſors; abductors and adductors, &c.

ANTARCTIC, ſomething oppoſite to the bear, a conſtellation near the north pole.

The word is formed from the Greek, αντι, againſt, or oppoſite, and αρκτος, a bear.

ANTARCTIC *Circle*, in geography and aſtronomy, is a ſmall circle of the ſphere, 23°. 30′. diſtant from the ſouth pole.

ANTARCTIC *Pole*, the ſame with ſouth pole. See SPHERE.

ANTARES, in aſtronomy, the name of a ſtar of the firſt magnitude, called alſo the ſcorpion's heart. Its longitude is 6°. 13′. 14″. of Sagittarius; and its latitude 4°. 31′. 26″. S.

ANTE, in heraldry, implies the pieces being let into one another, in the form expreſſed in blazoning; as by dove-tails, rounds, ſwallow-tails, or the like.

ANTECEDENT, in a general ſenſe, implies ſomething that goes before another, either with regard to time or place.

The word is Latin, *antecedens*, and compounded of *ante*, before, and *cedo*, to go.

Antecedent, in grammar, is the word to which the relative refers. Thus in the ſentence, "The book that "we read," the word book is the antecedent.

Antecedent, in logic, is the firſt propoſition of an enthymema. See the article **Enthymema**.

Antecedent, in mathematics, is the firſt of two terms in a ratio, being that which is compared to the other. Thus in the ratio of x to y, x is the antecedent. See Ratio.

Antecedent *Decree*, in the ſchool philoſophy, is a decree preceding ſome other decree. It is a famous diſpute whether predeſtination be a decree antecedent, or ſubſequent to faith.

Antecedent *Signs*, among phyſicians, ſuch as are obſerved before a diſtemper is formed ſufficiently to be reduced to any particular claſs. Thus a bad diſpoſition of the blood is an antecedent ſign, becauſe it precedes an infinite number of diſeaſes.

ANTECEDENCE, *Antecedentia*, in aſtronomy, implies an apparent motion towards the weſt, or contrary to the order of the ſigns.

ANTECHAMBER, in architecture, implies the chamber that leads to the chief apartment.

The word is compounded of the Latin propoſition, *ante*, before, and *chamber*.

ANTEDATE, in law, implies a ſpurious or falſe date, prior to the true date of any writing.

The word is compounded of the Latin, *ante*, before, and *datum*, a date.

ANTEDILUVIAN, in a general ſenſe, implies ſomething that exiſted before the deluge.

The word is Latin, and compounded of *ante*, before, and *diluvium*, a deluge.

Antediluvian *Philoſophy*, the philoſophy of the patriarchs before the deluge.

Some who have traced philoſophy back to its origin, are ſo far from ſtopping at the firſt man, that they ſoar to the ſkies, and ſeek it among the angels. But was Adam, the firſt man, really a philoſopher? This ſeveral make no doubt of. Hornius, in ſhort, tells us that, in his opinion, Adam, before his fall, was not only perfect in all knowledge, but alſo retained ſome veſtigia or traces of this perfection after his fall. The remembrance of what he had loſt being always in his mind, kindled in his heart a paſſionate deſire of recovering the knowledge ſin had robbed him of, and diſſipating the darkneſs which had thrown a veil over it. To ſatisfy this thirſt of knowledge, he dedicated his whole life to the contemplation of nature; and, carrying ſcience to the higheſt pitch, left moſt of his diſcoveries to his children, becauſe he lived long enough to communicate them. Such are the reaſonings of Dr. Hornius; to which we might add what the Jewiſh rabbins have wrote, if their fables merited our attention. But Hornius offers ſome farther arguments to prove Adam a philoſopher, and even of the firſt rank. Had he not been a naturaliſt, ſays Hornius, could he have given the animals names ſo expreſſive of their nature? Euſebius has brought a proof of Adam's logic. As to the mathematics, he muſt have certainly underſtood them, or he could never have made cloaths out of the ſkins of wild beaſts, have built him an houſe, obſerved the motions of the ſtars, and regulated the year by the courſe of the ſun. But the higheſt of all theſe convincing arguments, brought in favour of Adam's philoſophy, is this, that he wrote books, that theſe books contained all the ſublime ſciences which he had made himſelf maſter of with incredible labour. It is true, indeed, theſe books are apocryphal, or loſt; but that ſignifies nothing; becauſe tradition has preſerved the titles of the authentic books whereof he was the real author.

Nothing is more eaſy than to refute all theſe arguments: firſt, if we ſpeak of Adam's wiſdom before the fall, it has no relation to philoſophy in the ſenſe we accept it, for that wiſdom conſiſted in the knowledge of God and himſelf; but particularly in that practical knowledge which might lead him to the happineſs for which he was created. It is true, Adam poſſeſſed this kind of wiſdom; but what connection has this with a philoſophy which admiration and curioſity, the daughters of ignorance, produce, which is not acquired without the conflict of different opinions? The wiſdom with which Adam was created, was that divine wiſdom which is the fruit of grace, which God pours forth even on the weakeſt minds. This is, no doubt, a true philoſophy which the rational mind firſt conceived, and all ages have concurred to produce and carry to its preſent maturity. If Adam, in his ſtate of innocence, had no philoſophy, what will become of that they attribute to him after his fall, which was but a faint glimmering of what he had before? Would they perſuade us that Adam, whoſe ſin continually followed him, and who could think on nothing but the means of reconciling himſelf to God, and reſiſting the evils that ſurround him, had a mind ſufficiently at eaſe to apply himſelf to the barren ſpeculations of vain philoſophy? He gave names to animals; but does this prove him well acquainted with their nature and properties? He reaſoned with Eve, our common mother, and his children; from thence ſhall we conclude he underſtood the art of logic? By ſuch reaſoning as this we may make every man a logician. He built himſelf a poor cottage, governed his family prudently, inſtructed them in their duty, taught them religious worſhip; but are theſe ſufficient reaſons to prove Adam an architect, a politician, and divine? How can any one maintain Adam to have been the firſt inventor of letters, when it is evident that mankind, long after the flood, made uſe of hieroglyphics, the moſt imperfect of all kinds of writing, to convey their ideas to each other; and that this was the firſt attempt made of the kind. The wonders of nature are expoſed to our view in the moſt glaring light a long time before we have reaſon, opportunity, or penetration enough to enquire into them. If we came into the world with the ſame degree of reaſon with which we go to a play-houſe the firſt time, ſtruck, on the ſudden drawing of the curtain, with the magnificence of the ſcenes and decorations of the play, we could not forbear admiring its beauty, and examining its ſtructure; but who is ſurpriſed at what he has ſeen for a courſe of fifty years? Among men, the wants of ſome take up all their time to ſupply their neceſſities; they have none to apply themſelves to metaphyſical ſpeculations; the riſing ſun calls them to their labour; and the fineſt night that ever ſhone on the beſpangled ſky ſpeaks no language to them, or only ſays this, "Go, weary labourer, to reſt." Many of more leiſure either have not had an opportunity to interrogate nature, or wanted capacity to underſtand her anſwers. The philoſophical genius, whoſe ſagacity, ſhaking off the yoke of cuſtom, firſt gazed with admiration on the prodigies of nature which ſurrounded him, deſcended into himſelf, aſked himſelf queſtions, and gave himſelf anſwers concerning all the objects which he ſaw, muſt have been a long time in ſuſpence, might even have died without having credited his own opinions, ſays the author of the Eſſay on Merit and Virtue.

If Adam had no philoſophy, there certainly can be no inconſiſtence in denying it to his children Cain and Seth. Nor are we to imagine that either Jubal or Tubal-Cain were great philoſophers, merely becauſe the one invented muſic, and the other found out the ſecret of working in iron and braſs: perhaps they only improved what others diſcovered before them. But, ſuppoſing them to have been the inventors of theſe arts, does it follow as a neceſſary concluſion they muſt have been philoſophers? Every one knows that many of the arts, moſt uſeful to ſociety, owe their invention to chance; it is the part of philoſophy to reaſon on the genius ſhe diſcovers in them after they are found out. It is a bleſſing chance has prevented our wants, and left philoſophy almoſt nothing to do. Thus you ſee there is no philoſophy either in the branch of Cain or Seth. We find honeſt laborious men before the flood, who applied themſelves to agriculture, preſerved their primitive traditions, tended their flocks, and retained a true knowledge of God; but were no philoſophers: wherefore it is in vain to ſeek the origin and riſe of philoſophy in the time preceding the flood.

Antediluvian *World*, the earth as it exiſted before the deluge.

Dr. Burnet and Dr. Woodward differ very widely about the antediluvian world; the former imagines its face and appearance to have been ſmooth, equable, and in all reſpects different from what we now find it to be.

The latter, on the contrary, endeavours to prove that the face of the terraqueous globe, before the deluge, was the ſame as it is now, viz. unequal, diſtinguiſhed into mountains and dales; and having, likewiſe, a ſea, lakes, and rivers; that this ſea was ſalt, as ours is; was ſubject to tides, and poſſeſſed nearly the ſame ſpace and extent that it now does; and that the antediluvian world was ſtocked with animals, vegetables, metals, minerals, &c. that it had the ſame poſition, in reſpect of the ſun, which ours now hath, its axis not being parallel, but inclined, as at preſent, to the place of the ecliptic; conſequently, that there were then the ſame ſucceſſion of weather, and the ſame viciſſitudes of ſeaſons, as now. Mr. Whiſton imagines that the chaos, of which our earth was formed, had been the atmoſphere of a comet; that the annual motion of the earth began as ſoon as it aſſumed a new form; but that the diurnal motion did not take place till the fall of Adam; that before the deluge, the year began at the autumnal equinox; that the orbit of the earth was a perfect circle; and that the ſolar and lunar years were the ſame, each conſiſting of juſt three hundred and ſixty days. The ſtate of the antediluvian philoſophy has likewiſe been the ſubject of much debate among authors.

ANTELOPE, in natural hiſtory, the name of an animal called, by Latin authors, *gazella Africana*, and thought by ſome to be the ſame as the Lybian goat.

The antelope is very ſwift; has a white belly, and the reſt of the body of a fallow colour; the white and the fallow on the ſides are parted by a black ſtripe; the eyes are black, the ears large, the tail blackiſh, and a ſtripe a little more brown than the reſt of the hair deſcends from the eye down to the muzzle. He is about the ſize of a roe-buck, and his hair very ſhort. Under the hair the ſkin is black and ſhining, though in ſome it is greyiſh. The ears are large and bald within, where the ſkin is black, like poliſhed ebony. The eyes are black and large; and the horns are likewiſe black, ſtriped croſsways. They are about fifteen inches long, and near an inch in diameter at the bottom. They are ſharp at the points, and pretty ſtraight, though they turn a little outwards in ſome places, and in others inwards. The horns of the male are bent a little more back than thoſe of the female, which are very round; but thoſe of the male are a little flattiſh.

Theſe horns at the root have a tuft of hair longer than that on the reſt of the body, and are hollow about half way, in which is a pointed bone that faſtens them to the ſkull by help of the ſkin that covers them. This ſkin is very hard, thick, and full of blood veſſels.

The noſe is a little flat, like that of a goat, but more in the males than the females. The palate is covered with a hard ſkin in the form of long ſcales, and there are no fore teeth in the upper jaw, it being a ruminating animal. The tail of the females is covered with long blackiſh hair; but in the males it is but little longer than on the reſt of the body, and yet it is more ſoft than the former. The fore legs, about the part called the knee, are furniſhed with pretty long coarſe hair; and here likewiſe the ſkin is thicker than in other parts, and ſeems to ſerve inſtead of a cuſhion to kneel down upon, like the calloſity in the knee of a camel. The feet of the antelope are more cloven than in moſt other animals, and covered with hoofs of a horny ſubſtance, forming the two points of the toes, that are tied together by a ſkin which will ſtretch greatly. The female antelope has but two udders and two teats, and on each ſide the udders in the groin are deep cavities, where the ſkin is without hair, like the teats. Theſe cavities diſcharge an unctuous matter, which has given occaſion for ſome to miſtake the antelope for the civet cat, but very abſurdly, for they are quite different animals.

ANTENNÆ, in natural hiſtory, ſlender bodies, with which nature hath furniſhed the heads of inſects, being the ſame with what are called in Engliſh the horns or feelers.

ANTEPENULTIMA, in grammar, the third ſyllable of a word from the end, or the laſt ſyllable but two.

ANTEPREDICAMENTS, in logic, certain preliminary queſtions tending to illuſtrate the doctrine of predicaments and categories. See PREDICAMENTS.

ANTEVIRGILIAN *Huſbandry*. See HUSBANDRY.

ANTHELIX, in anatomy, the inward protuberance of the external ear. See EAR.

ANTHELMINTICS, among phyſicians, medicines proper to deſtroy worms. See WORMS.

ANTHEM, a church ſong, conſiſting of ſome paſſages of Scripture ſet to muſic, and adapted to ſome ſolemnity.

ANTHERÆ, in botany, the ſmall roundiſh or oblong bodies on the tops of the ſtamina of plants. See STAMINA.

ANTHOLOGY, a diſcourſe on flowers; or a collection of beautiful paſſages from famous authors.

The word is compounded of the Greek, ανθος, a flower, and λογος, a diſcourſe.

ANTHOLOGY is alſo a name given to a collection of Greek epigrams.

ANTHONY, or *Knights of St.* ANTHONY, a military order inſtituted by Albert, duke of Bavaria, Holland, and Zealand, when he meditated a war againſt the Turks in 1382. The knights wore a collar of gold, made in the form of a hermit's girdle, from which hung a ſtick, cut in the form of a crutch; as repreſented in the pictures of St. Anthony.

St. ANTHONY'*s Fire*, a name ſometimes given to the eryſipelas. See ERYSIPELAS.

ANTHOPHYLLI, a name given to the larger ſpecies of cloves. See CLOVES.

ANTHORA, yellow helmet flower, counterpoiſon monks-hood, or wholeſome wolfsbane, in botany, the name of a plant with divided leaves, and naked flowers, conſiſting of five petals, the uppermoſt of which is ſhaped like a hood; each flower is followed by three or more pods, containing wrinkled angular ſeeds. It is diſtinguiſhed from the other aconites or wolfsbanes, by the leaves not being gloſſy, by their being cut quite down to the pedicle, and by the ſegments being very narrow, and of nearly the ſame width from end to end.

This plant is a native of the Alps and Pyrennees, from whence the dried roots are ſometimes brought to us. They are generally of an irregular roundiſh ſhape, ſometimes a little oblong, of a brown colour on the outſide, and white within, hard to break, but not tough.

ANTHOS, a Greek word, properly ſignifying a flower; but uſed by way of eminence for roſemary. See ROSEMARY.

ANTHRAX, a name by which the ancients called a gem known at preſent by the name of carbuncle. See CARBUNCLE.

ANTHROPOGRAPHY, the deſcription of the human body, its parts, ſtructure, &c.

The word is formed from the Greek ανθρωπος, a man, and γραφω, to deſcribe.

ANTHROPOMORPHITES, a ſect of heretics, ſo denominated from ανθρωπος, man, and μορφη, ſhape; for they, through great ſimplicity, taking every thing ſpoken in Scripture of God in a literal ſenſe, particularly that paſſage in Geneſis, in which it is ſaid, that God made man after his own image, imagined him to be in the ſhape of a man, having real hands, feet, &c.

ANTHROPOPHAGY, the act of eating human fleſh.

The word is formed the Greek, ανθρωπος, a man, and φαγω, to eat.

ANTHYPOPHORA, in rhetoric, the ſame with hypophora. See HYPOPHORA.

ANTICARDIUM, in botany; ſee the article SCROBICULUM.

ANTICHRIST, among eccleſiaſtical writers, implies a great adverſary of chriſtianity, who is to appear upon the earth before the end of the world.

ANTICOR, in farriery, implies an inflammation of a horſe's throat, being the ſame with the quinzy in the human ſpecies.

ANTIDOTE, among phyſicians, implies a remedy againſt peſtilential diſeaſes.

It alſo ſignifies a medicine which prevents the ill effects of poiſon.

ANTIENT, or ANCIENT, a term applied to things that exiſted long ago.

Antient, in a military ſenſe, implies the enſign or colours.

Antient, in naval affairs, ſignifies the flag carried at the ſtem of a ſhip.

ANTILOGARITHM. See the article Logarithm.

ANTILOGY, in literature, denotes an inconſiſtency between two or more paſſages of the ſame book.

ANTIMONARCHICAL, a name given to whatever oppoſes monarchical government.

ANTIMONY, in natural hiſtory, a blackiſh mineral ſubſtance, ſtaining the hands, full of long, ſhining, needle-like ſtriæ, hard, brittle, and conſiderably heavy.

It is found in different parts of Europe, as Bohemia, Saxony, Tranſylvania, Hungary, and France, commonly in mines by itſelf, intermixed with earthy or ſtony matters. Sometimes it is blended with the richer ores of ſilver, and renders the extraction of that metal difficult; antimony volatilizing a part of the ſilver, or, in the language of the miners, robbing the ore. Antimony is ſeparated from its natural impurities by fuſion in an earthen pot, whoſe bottom is perforated with a number of holes; the fluid antimony paſſing through, whilſt the unfuſible matters remain behind. The melting veſſel is let into another pot ſunk in the ground, and which ſerves as a receiver: this laſt is of a conical figure, and ſuch accordingly is the ſhape of the loaves of antimony met with in the ſhops. The juncture of the two veſſels is cloſely luted; the uppermoſt one covered, and a fire made round it; and ſeveral ſets of this apparatus worked at once. In ſome places, inſtead of a pot with a perforated bottom, one is taken which has no bottom, and a perforated iron-plate placed betwixt it and the receiver; but the other method is to be preferred, as antimony in fuſion is apt to diſſolve a part of the iron.

Antimony has been by many eſteemed a poiſon. In 1566, its uſe was prohibited in France by an edict of parliament; and in 1609, one Beſnier was expelled from the faculty for having given it. The edict was repealed in 1650; antimony having a few years before been received into the number of purgatives. In 1668, a new edict came forth, prohibiting its being uſed by any one but the doctors of the faculty. Others again have been extravagantly fond of it, and aſcribed to it extraordinary virtues, as Alexander Van Suchten, Glauber, and Faber: Baſil Valentine ranks it among the wonders of the world, and places it in a triumphal car. Thus much is certain, that antimony, in its crude ſtate, is not a poiſon, but a medicine of great efficacy; an excellent reſolvent and purifier of the juices, if given from four grains to half a dram, along with abſorbents: that it is capable of being rendered, by various operations and additions, either truly poiſonous, or more medicinal than in its crude ſtate: that its moſt virulent preparations may, by ſlight managements, be made ſalutary; and its moſt ſalutary ones virulent.

Antimony is not a pure ſemimetal, but a ſulphurated ſemimetal. Thrown into the fire, it burns with a blue flame and ſulphureous vapours: on digeſting powdered antimony in aqua regia, the metallic part is diſſolved, and the ſulphur left. The ſulphur of antimony, purified from the metallic part, is perfectly the ſame with the common brimſtone of the ſhops, poſſeſſing the ſame properties, and anſwering the ſame uſes: if the ſemimetal, freed from the ſulphur naturally mixed with it, be afterwards melted with common brimſtone, it reſumes the appearance and qualities of crude antimony. Many have imagined, that this mineral, beſides common ſulphur, contains a golden or ſolar ſulphur; becauſe antimony purifies and heightens the colour of gold, and becauſe it diſſolves, as gold does, in aqua regia. But, with regard to the ſolubility in aqua regia, it is not the ſulphureous, but the metallic matter of the antimony that diſſolves: if nothing beſides gold and antimony were acted upon by that menſtruum, there might be ſome plauſibility in the argument; but ſurely, when ſo many ſubſtances diſſolve in it, as iron, copper, lead, tin, quickſilver, zinc, various earths, &c. ſolubility in aqua regia can be no proof of a ſolar impregnation. In the purification of gold, the ſulphur of antimony has no other effect than common brimſtone would equally produce: when gold, containing an admixture of other metals, is melted with antimony, the ſulphur, having little affinity with its own ſemimetal, forſakes it, and unites with the ſilver, copper, or other metallic bodies mixed with the gold, but has no action on the gold itſelf: thus only the impurities of the gold are combined with the ſulphur of the antimony into a ſcoria, which flows on the ſurface; whilſt the gold and the ſemimetal of the antimony form one compound at the bottom: if this compound be expoſed to a ſtrong fire, and a free draught or blaſt of air, it evaporates in fumes, and leaves the gold pure behind it. This proceſs ſhews the reſiſtance of gold to ſulphur, and to the volatilizing power of the antimonial ſemimetal, but ſurely gives no foundation for imagining a ſolar ſulphur to exiſt in antimony. — As gold is the only metal (platina excepted) that totally reſiſts antimony or its ſulphur, this mineral has been called by the chemiſts *balneum ſolius ſolis, balneum regis, lupus, ultimus judex, &c.*

The ſeparation of metallic bodies from ſulphur, by fuſion, is no other than a ſpecies of precipitation, and accordingly is called by ſome dry precipitation; as it depends upon the addition of ſome third ſubſtance, whether metallic or not, to which the ſulphur has a greater affinity than to that metal which it is already combined with: in conſequence of this affinity, the ſulphur in fuſion lets go its metal to unite with the ſubſtance ſuperadded, and forms with this a light ſcoria, from which the other ſubſides by its own gravity. This is the foundation of all the dry partings of metals: metallic bodies, ſeparated by this dry precipitation, are commonly called reguli, eſpecially when brittle. The metallic part of antimony, in particular, is diſtinguiſhed by no other name than that of regulus of antimony.

The proportion of regulus and ſulphur in crude antimony, it is difficult and ſcarce poſſible to exactly determine; as there is always ſome loſs in purifying either the ſulphur from the regulus, or the regulus from the ſulphur. There is reaſon to believe that the regulus amounts to one half the quantity of the compound, and rather more than leſs.

The regulus of antimony by precipitation is obtained by melting the antimony with fixed alkaline ſalts, iron, copper, tin, &c. the ſulphur having a greater affinity with theſe than with the regulus, and forſaking the latter to unite with the former. The regulus prepared with alkalies is called ſimple; that with metallic bodies is diſtinguiſhed by the name of the particular metal, martial, venereal, jovial, &c. All theſe methods are attended with ſome inconveniencies. Alkaline ſalts effectually abſorb the ſulphur; but they form with it a *hepar ſulphuris*, which in fuſion diſſolves all the metals: hence, in proportion as the regulus is freed from its ſulphur by the alkali, a part of it is taken up again by the compound which the ſulphur forms with the alkali: one third, one half, and often three fourths of the regulus are thus rediſſolved; and often we find very little regulus left. Metallic additions are free from this inconvenience, and conſequently occaſion the yield of regulus to be much larger: but the regulus thus obtained is never entirely free from ſome portion of the metal ſuperadded. Some have endeavoured to promote the ſeparation of the regulus by inflammable additions, as powdered charcoal, pitch, reſin, &c. but theſe do not at all mend the matter. Antimony, treated with inflammable ſubſtances alone, yields no regulus; and if alkaline ſalts alſo are taken, the inconveniencies will ſtill be the ſame as when thoſe ſalts are uſed by themſelves. Many have ſubſtituted to alkaline ſalts crude tartar, or a mixture of tartar and nitre, and thought that then they employed no alkalies; not aware that thoſe are the very ſalts from which alkalies are produced for chemical uſes by the action of fire; and that they do not here effect the intended ſeparation, till the heat has reduced them to that ſtate. There are however ſome differences obſerved in the quantity of regulus according to the different additions.

Kunckel has given a method of preparing regulus of antimony by calcination. He calcines the antimony till it ceaſes to emit any ſulphureous ſmell with care, to prevent its running into lumps; then mixes the calx with oil or fat, and a little powdered charcoal, puts the mixture into a crucible to melt, and, as ſoon as the regulus begins to ſhew itſelf, injects by degrees ſome powdered nitre, in the proportion of an ounce to a pound of antimony: the matter in thin fuſion being poured out, a pure regulus is obtained, in much greater quantity than by the foregoing methods. There is another, but more expenſive, way of procuring a large yield of pure regulus; namely, by extracting the regulus from the antimony by acid menſtrua, as aqua regis, or ſpirit of ſalt, precipitating it from this ſolution; and afterwards reviving the precipitate, by melting it with inflammable additions.

Pure regulus of antimony, by whatever means obtained, is a bright ſemimetal, reſembling tin or duſky ſilver; without any thing of the bluiſh caſt of zinc, or the yellowiſh one of biſmuth. It is one of the lighteſt of the metallic bodies, (about ſeven times ſpecifically heavier than water) moderately hard, entirely brittle, and of a ſparkling plated texture. In a fire not very ſtrong, it ſmokes copiouſly, and by degrees totally evaporates: by a gentler fire, continued for ſome time, it is changed into a whitiſh calx; which, on raiſing the heat, melts into a yellowiſh or reddiſh glaſs. Melted with ſilver, or the malleable metals, it renders them hard and brittle. It deſtroys the magnetic power of iron, which other metallic bodies only weaken in proportion to their quantity. It does not amalgamate, or not without great difficulty, with mercury: if a mixture of it with ſilver and copper be reduced into fine powder, even thoſe metals will not, in that ſtate, be acted upon by mercury. In the human body it acts as a virulent emetic and cathartic; and impregnates vegetable acids, as vinegar and acid wines, with thoſe virtues, almoſt inexhauſtibly. By ſulphur, and by calcination with nitre, its malignity is abated, and its emetic power changed into a diaphoretic one. As ſoon as it is reſtored to its pure metallic ſtate, it reſumes its virulence; which may be again deſtroyed, and again reſtored, and almoſt infinitely varied.

Hoffman has given an account of the different medicinal effects of antimony, as depending on its different treatments. He obſerves, that crude antimony, on account of the regulus being corrected by the ſulphur, is not only ſafe, but in many caſes a medicine of great ſervice, both for man and other animals. That by ſimple fuſion it acquires a degree of malignity; but a far greater if melted with half its weight of nitre, which conſumes nearly all the ſulphur, and leaves the regulus bare. That antimony, or its regulus, mixed with common ſalt, calcined over a gentle fire for ſeveral hours, and kept continually ſtirring, and afterwards edulcorated with water, yields an aſh-grey calx, which is ſo fixed as to bear a melting heat, and proves a mild and ſafe diaphoretic, void of any malignant or emetic quality. That antimony, by calcination with a gentle fire in an earthen veſſel, in the open air, changes into a calx, which melts with difficulty, and which has no malignity. That if this calx be melted with a ſtrong fire into glaſs, it becomes ſo active, that a few grains ſhall occaſion violent vomiting and purging, or even mortal convulſions and inflammations. That the powdered regulus, calcined in a glaſs-vial placed in ſand for ſeveral days, becomes a greyiſh diaphoretic powder; which reduced into regulus by fuſion with powdered charcoal, nitre, and a little fat, proves again virulent. That when antimony is melted with one fourth its weight of ſalt of tartar, the whole poured into a mould, the ſcoria ſeparated, and the more ponderous matter pulverized; the reddiſh powder thus obtained, is ſalutary: but that when antimony is melted with three or four times its weight of ſalt of tartar, both the ſcoriæ and the regulus are virulent. That equal parts of antimony and nitre, melted together, yield a virulent maſs; but one part of antimony, with two or three of nitre, is an uſeful diaphoretic. That on melting the diaphoretic calces with fat, charcoal powder and nitre, the virulent regulus is revived. And thus one preparation may be changed into another, a ſalutary into a poiſonous, and a poiſonous into a ſalutary one.

Preparations of ANTIMONY.—The preparations of antimony are extremely numerous. Lemery, in his Treatiſe on Antimony, deſcribes no leſs than two hundred; among which there are many good, and many uſeleſs ones. That gentleman was an excellent chemiſt, but an unhappy philoſopher: we may depend on his operations, but we ſhould diſtruſt his theory. With regard to the antimonials, the greater number even of the common preparations is unneceſſary; many of them differing little from one another, and all of them being either emetic or diaphoretic. The preparations of antimony may be ranged, according to the general operations by which they are produced, under four heads; thoſe obtained by ſolution, by diſtillation, by ſublimation, and by calcination.

Golden Sulphur of ANTIMONY.—If powdered antimony be boiled in alkaline lixivia, or ſope leys; the ſulphur, and, by the mediation of the ſulphur, a part of the regulus, will be diſſolved into a yellowiſh red liquor. Any acid added to this ſolution precipitates what the alkaline liquor had taken up, in form of a yellowiſh or reddiſh powder, called ſulphur, or golden ſulphur of antimony; the powder which ſettles firſt is groſſer and darker coloured than thoſe which follow; it appears of a deep reddiſh brown, whilſt that which ſubſides laſt is of a pale yellow. The firſt is alſo the moſt active.

There are ſundry variations of this proceſs, both in regard to the ſolution and the precipitation. A difference in the manner of preparing the ſolution does not ſeem to affect the virtue of the medicine; but a difference in the acid uſed for the precipitation does; different acids having very different effects upon antimony: thus, whilſt the marine renders it highly corroſive, or emetic, the addition of the nitrous deſtroys the virulence of both preparations, and renders the antimony mildly diaphoretic.

All the antimonial ſulphurs are emetic and cathartic: thoſe which precipitate firſt are much more ſtrongly ſo than the powder which falls laſt; the laſt precipitates, if they prove emetic once or twice, ceaſe to have that effect upon continuing their uſe, and act chiefly as diaphoretics; and hence are greatly to be preferred to the firſt.—A powder is vended by the Carthuſian friars in Paris, at a conſiderable price, as a ſpecific againſt ſundry diſorders; commonly called poudre des chartreux, but by themſelves kermes mineral. See KERMES *Mineral*.

Butter of ANTIMONY. — For diſſolving the regulus of antimony without the ſulphur, the moſt concentrated ſpirit of ſalt, or aqua regis, is neceſſary. For obtaining the ſolution in ſpirit of ſalt, mercury ſublimate and powdered antimony are mixed together, and digeſted in a glaſs-retort placed in ſand: the marine acid in the ſublimate forſakes the mercury, and corrodes or diſſolves the antimonial regulus; whilſt the mercury of the ſublimate unites with the antimonial ſulphur. But the ſolution of the regulus, thus effected, cannot be commodiouſly ſeparated from the other matter but by diſtillation: on increaſing the fire, the regulus ariſes, diſſolved in the concentrated acid not in a liquid form, but in that of a thick unctuous ſubſtance, like butter; hence called butter of antimony. The butter liquefies by heat; and requires the cautious application of a live coal to melt it down from the neck of the retort. By rectification or expoſure to the air, it becomes fluid, but ſtill retains the name of butter. The addition of water, either in its thick or fluid ſtate, by diluting the acid, precipitates the regulus diſſolved in it. The proportions of ſublimate and antimony commonly employed, are three parts of the former to one of the latter.

Flowers of ANTIMONY. — Theſe are prepared by ſubliming either the crude antimony, or the regulus, with a number of aludels; the fire being kept up ſtrong, and a blaſt of air impelled occaſionally by a pair of bellows upon the matter in the ſubliming pot, to promote its evaporation. The antimonial flowers are in general of great activity, and though recommended by ſome as arcana in particular diſorders, require to be uſed with great caution.

Cinnabar of ANTIMONY. — After the diſtillation of butter of antimony, the mercury and the ſulphur, contained in the ingredients made uſe of for that proceſs, remain behind in the retort. This compound appears of a black colour; urged with a ſtronger fire than that which elevated the butter, it ſublimes into a red maſs, called cinnabar of antimony. This cinnabar has been by many preferred to the common factitious cinnabar, but on no juſt foundation: they both conſiſt of mercury combined with ſulphur; and the only difference betwixt them is, that the antimonial cinnabar contains ſomewhat more ſulphur than the other, and hence appears of a darker colour.

Glaſs of Antimony.—This is chiefly prepared by ſome particular perſons at Amſterdam and Rouen, who have furnaces contrived on purpoſe for calcining large quantities of antimony with little expence of fuel. The glaſs may be eaſily made, by urging the calx in a crucible with a ſtrong fire, and throwing in, towards the end, a little crude antimony or ſulphur. When the vitrefication is completed, the glaſs is poured on a copper plate, or on a flat ſtone. The glaſs of antimony is uſed only for making other emetic preparations, as the emetic wine, &c.

Hepar Antimonii, liver of antimony.—Equal parts of crude antimony and nitre mixed together, ſet on fire and ſuffered to deflagrate in an iron mortar, which may be covered with a perforated plate, or injected by degrees into an ignited crucible, yield a liver-coloured maſs, called hepar antimonii, which pulverized and edulcorated with water is named crocus metallorum. Two, three, or even one grain of either of theſe preparations occaſion violent anxieties and vomitings; though a dog will bear a dram, and a horſe a whole ounce, without being apparently any otherwiſe affected than in having the alvine diſcharge increaſed. The emetic wine, emetic tartar, and other medicines made from the glaſs, may alſo be made from the crocus.

Diaphoretic Antimony.—One part of antimony and two and a half or three of nitre, mixed together and deflagrated, yield a calx void of all emetic power, called diaphoretic antimony.

The martial Diaphoretic Antimony, or *Specific Stomachic of Peterius*, is prepared by melting equal parts of antimony and iron filings, injecting upon them in fuſion thrice their weight of powdered nitre, and after the detonation is over, edulcorating and drying the calx. The jovial diaphoretic antimony, or antihectic of Poterius, is made in the ſame manner, from a mixture of tin and martial regulus of antimony, in the proportion of one part of tin to four of the regulus. This preparation has no claim to antihectic virtues, nor indeed to any ſalutary operation.

Regulus of Antimony.—The ſimple regulus of antimony is commonly prepared from equal parts of antimony, nitre, and tartar, mixed together and injected into a red-hot crucible: when the whole is thrown in, the crucible is to be covered, a ſtrong fire kept up for a quarter of an hour, and the matter poured out into a conical mould previouſly warmed and rubbed with greaſe. The yield of regulus will be larger, if the quantity of nitre is diminiſhed; or if the nitre and tartar are deflagrated together, in the proportion of one part of the former to two of the latter, before their mixture with the antimony. The ſalts are reduced by the deflagration into a black alkaline coal; this is the ſubſtance commonly uſed by the chemiſts for promoting the fuſion of metallic calces, and reviving them into their metallic form, and hence is diſtinguiſhed by the name of black flux. Some have been accuſtomed to ſave the expence of nitre, by taking pot-aſh or other alkaline ſalts: the regulus is in both caſes the ſame. When the matter is grown cold, the ſcoriæ found on the ſurface are knocked off, the regulus reduced into coarſe powder, melted in a freſh crucible, and about one fourth its weight of purified nitre injected upon it; this depuration may be twice or thrice repeated with ſmaller proportions of nitre, till the ſcoriæ become ſemitranſparent and of an amber colour.

Martial Regulus of Antimony. This preparation is obtained very commodiouſly from four parts of powdered antimony, two parts of iron nails or wire, and one part of nitre. The iron, made red hot in a crucible, ſoon melts upon adding the antimony; after which the nitre is to be injected, the crucible covered, and the matter, when brought into thin fuſion, poured expeditiouſly into a warm greaſed cone. The regulus freed from the ſcoriæ, is to be melted afreſh, with about one fourth its weight of nitre; and this purification, if neceſſary, repeated. If the regulus retains any ſuperfluous iron, it will look greyiſh, ſpongy, prove hard to break, and difficult of fuſion: in ſuch caſe, the ſcorification of all the iron, by means of nitre, would be a tedious work; but the addition of a little crude antimony, or common ſulphur, will abſorb it at once; and the injection of nitre will now ſoon complete the purification, and render the regulus of a ſparkling white colour. The ſcoriæ are yellow and ſemitranſparent, like amber; if the quantity of nitre has not been too large, they prove an exceſſively ſtrong fiery alkali, diſtinguiſhed by the name of nitrum cauſticum. The yellow ſcoriæ, which ſeparate in the depuration of the ſimple regulus with nitre, are likewiſe alkaline, but want the cauſticity of theſe: the ſcoriæ produced from the martial regulus, by calcination with tartar, take fire on being expoſed to the air. If either regulus, after due purification, be haſtily poured into the mould whilſt in exceeding thin fuſion, and if the quantity of ſcoriæ covering the ſurface is conſiderable, the regulus, when grown cold, exhibits the appearance of a ſtar upon the top. For producing this appearance, there is no occaſion for any particular ſort of antimony, or any particular iron, or any particular conſtellation, or ſeaſon, or weather, as many have idly imagined; the whole depending upon the circumſtance abovementioned.

The ſimple regulus is caſt into cups, which, like thoſe made from the glaſs, communicate an emetic quality to wines; and into pills, like ſhot, which prove ſtrongly purgative, and do not loſe their virtue in paſſing through the body; whence their name pilulæ perpetuæ.

Tincture of Antimony.—There are various tinctures of antimony, which ſome have fondly imagined to participate of ſolar, venereal, antimonial, and other impregnations. They appear to be all no other than ſimple alkaline tinctures; their colour proceeding from the oily matter of the ſpirit of wine, heightened by the cauſtic alkali. Spirit of wine conſiſts of an oil highly attenuated and combined with water into one ſeemingly homogene liquor: if the moſt highly rectified ſpirit, which exhibits no mark of any phlegm, be employed for making theſe tinctures, it will now yield in diſtillation a good quantity of water; the oil, before combined with that water, having been abſorbed by the alkali. If cauſtic alkaline ſalt, alone, be poured hot into rectified ſpirit, and the mixture digeſted for ſome time, a tincture will be obtained, not diſtinguiſhable from the antimonial. If ſulphur be added in either caſe, the tincture will receive a conſiderable taſte and ſmell from that ingredient.

ANTINOMIANS, in eccleſiaſtical hiſtory, certain heretics, who firſt appeared in the year 1535.

The word is formed from the Greek, *αντι*, againſt, and *νομος*, a law.

They were ſo called, becauſe they rejected the law, as of no uſe under the Goſpel diſpenſation. They held, that good works do not further, nor evil hinder, ſalvation; that the child of God cannot ſin; that God never chaſtiſes any land for their ſins; that murder, adultery, drunkenneſs, and the like, are no ſins in the children of God; that an hypocrite may have all the graces that were in Adam before his fall; and the like ſtrange opinions.

ANTIPARALLELS, in geometry, are thoſe lines as F E, BC, (plate XV. *fig.* 1.) that make the ſame angles A F E, A C B, with the two lines A B, AC, cutting them, but contrary ways, as parallel lines that cut them. When the ſides A B, A C, of a triangle, as A B C, are cut by a line E F, antiparallel to the baſe B C, the ſides are cut reciprocally proportional by the ſaid line E F, that is, A F : BF :: EC : A E, the triangles A F E, A B C, being ſimilar.

If an oblique cone, having a circle for its baſe, be cut by a plane antiparallel to its baſe, the figure of the ſection will be a circle. See Cone.

ANTIPATHY, a natural averſion of one body to another; the oppoſite to ſympathy.

The word is Greek, *αντιπαθεια*, and compounded of *αντι*, againſt, and *παθος*, affection.

ANTIPERISTALTIC *Motion of the Inteſtines*, is a motion directly oppoſite to the periſtaltic. See the article Peristaltic.

ANTIPERISTASIS, in the peripatetic philoſophy, an imaginary method of increaſing the power or force of any quality, by the oppoſition of its contrary. Thus, cold is ſaid to augment the heat of fire; a doctrine now ſufficiently exploded.

The word is Greek, αντιπεριϛασις, and compounded of αντι, about, and περιϛαμι, to encompaſs, or ſurround.

ANTIPHONY, alternate ſinging; as when a congregation, divided into two parts, repeats or ſings a pſalm, or anthem, verſe for verſe, one after the other.

The word is compounded of the Greek, αντι, oppoſite, and φωνη, a voice.

Antiphony is oppoſed to ſymphony, which is ſinging jointly, or all together. St. Auſtin carries the original of this way of ſinging, in the weſtern church, no higher than the time of St. Ambroſe, when it was firſt introduced into the church of Milan; which example was ſoon followed by the other weſtern churches. What was the original of it in the eaſtern church, is not ſo certainly agreed upon by writers, either ancient or modern. It was a method of ſinging ſo taking and delightful, that it was often uſed, when only two or three were met together for private devotion. And Socrates particularly remarks of the emperor Theodoſius the younger, and his ſiſters, that they ſung alternate hymns together every morning in the royal palace.

ANTIPHRASIS, in rhetoric, a figure, by which, in ſaying one thing, they mean the contrary. See the article IRONY.

The word is Greek, and compounded of αντι, oppoſite, and φραζω, to ſpeak.

ANTIPODES, in geography, a name given to thoſe inhabitants of the globe that live diametrically oppoſite to each other.

The word is Greek, and compounded of αντι, oppoſite, and πους, a foot; becauſe their feet are oppoſite to each other.

The antipodes lie under oppoſite meridians and oppoſite parallels; in the ſame degree of latitude, but of oppoſite denominations, one being north, and the other ſouth. They have nearly the ſame degree of heat and cold, days and nights of equal length, but in oppoſite ſeaſons. It is noon to one, when midnight to the other; and the longeſt day with the one, is the ſhorteſt with the other.

We have ſaid the antipodes have nearly the ſame degree of heat and cold, not abſolutely the ſame of neceſſity; becauſe, firſt, there are many accidents to modify the action of the ſolar heat; ſo that people ſituated in the ſame climate, have not the ſame temperature of air. This may, in general, be accounted for by the interpoſition of mountains, the nearneſs or diſtance of the ſea, the winds, &c. Secondly, the ſun is not throughout the whole year at the ſame diſtance from the earth; it is ſenſibly at a greater diſtance in the month of June, than in January; from whence it follows, that, *conſideratis conſiderandis*, our ſummer in England is not ſo hot as that of our antipodes, and our winter leſs cold. Nay, ice is found in the ſeas of the ſouthern hemiſphere, at a much leſs diſtance from the equator, than in thoſe of the northern hemiſphere.

The horizon of one place being 90 degrees diſtant from the zenith of the other, it follows, that the antipodes have the ſame horizon; it follows alſo, that when the ſun riſes to the one, he ſets to the other.

Plato is eſteemed the firſt who thought it poſſible that the antipodes ſubſiſted, and is looked upon as the inventor of the word. As this philoſopher apprehended the earth to be ſpherical, he had only one ſtep to make to conclude the exiſtence of the antipodes.

The ancients, in general, treated this opinion with the higheſt contempt; never being able to conceive how men and trees could ſubſiſt ſuſpended in air with their feet upwards; for ſo they apprehended they muſt be in the other hemiſphere.

They never reflected that theſe terms, upwards and downwards, are merely relative; and ſignify only nearer to, or farther from, the center of the earth, the common center to which all heavy bodies gravitate; and that, therefore, our antipodes have not their feet upwards and head downwards any more than ourſelves; becauſe they, like us, have their feet nearer the center of the earth, and their heads further from it. To have the head downwards and feet upwards, is to place the body in a direction of gravity tending from the feet to the head; but this cannot be ſuppoſed with regard to the antipodes; for they, like us, tend towards the center of the earth, in a direction from head to foot.

If credit may be given to Aventinus, Boniface, archbiſhop of Mentz, and legate of pope Zachary, in the eighth century, declared one Virgil, a biſhop in that age, a heretic, for having dared to maintain there were antipodes.

We have conſidered the antipodes here, as being placed diametrically oppoſite to the terreſtrial globe; ſo that a perpendicular or vertical line being drawn through any place whatever, and which conſequently paſſes through the zenith of that place, the oppoſite part on the ſurface of the globe, which this vertical line continued would cut, is the ſituation of the antipodes to that place: this depends on a ſuppoſition of the earth's being a perfect ſphere; for if the earth be not a perfect ſphere, but an oblate or prolate ſpheroid, there are no reciprocal antipodes: that is, for inſtance, if a line be drawn through the zenith of London, and center of that city, which is in the northern hemiſphere, this line would cut the ſouthern hemiſphere in a point which will be diametrically oppoſite to London; but London then will not be the antipodes to this place. Thus the reciprocal equality of ſituation, latitude, day and night, in the oppoſite hemiſpheres at ſix months diſtance, and all that we are uſed to include in the idea of antipodes, as inſeparable from it, is no longer ſo; and muſt alter, in proportion as the figure of the earth deviates from a true ſphere. A little attention will convince us of this.

What we have advanced is founded on this poſition, that the ſphere, or, to render the theory more ſimple, the circle, is the only regular figure which all diametrical lines drawn through the center cut at right angles: therefore, in every figure terminated by another kind of curve, to inſtance in the ellipſis, the perpendicular drawn to one of its foci, or to its tangent, except the two axes which correſpond to the polar line, or a diameter drawn at the equator, will not paſs through the center, nor cut the oppoſite part of the ellipſis at right angles; therefore the nadir of Paris or London is not the zenith of their reſpective antipodes. So if, in the center of London or Paris, a perpendicular column were erected, and another in their reſpective antipodes, it would not make the ſame right-line, but would form an angle more or leſs acute, in proportion as the ellipſis departed more or leſs from a circle; and, conſequently, the latitude, days, nights, ſeaſons, &c. would alter in the ſame proportion. Places ſituated under either pole, or on the equator, are excepted for the reaſon we have before ſuggeſted; becauſe, in the former caſe, it is one of the axes of the ellipſis that joins both foci, and in the latter it is always a circle, the other axis of which is the diameter of the ellipſis; the ſpheroid, however oblate or prolate, being always ſuppoſed to reſult from the revolution of the elliptical meridian round the axis of the world. See *Hiſt. Acad.* 1741.

ANTIPOPE, in the Romiſh church, implies a perſon elected pope in an irregular manner, in oppoſition to another.

ANTIPTOSIS, in rhetoric, is a figure which puts one caſe for another.

The word is Greek, and compounded of αντι, oppoſite, and πτωσις, a caſe.

ANTIQUARIAN *Society*. — A ſociety of antiquaries was formed in the city of London, about the year 1580, by ſome of the moſt learned men in the kingdom; but, having been frequently interrupted and diſcontinued, very little can be ſaid concerning the ſame till the year 1717, when it was again revived by a number of gentlemen, ſtudious of antiquity in general, but more particularly deſirous to obtain all poſſible knowledge of the antiquities of their own country. With this view they agreed to meet one evening in every week under certain regulations; they encouraged correſpondencies with all parts of the kingdom; they ſubſcribed an annual ſum to defray the expence of engraving on copper-plates, what ſhould be thought deſerving to be ſo preſerved, and limited their number to 100. And in this manner they continued their weekly meeting with great reputation, till his majeſty king George II. was graciouſly pleaſed to grant them a royal charter of incorporation, dated November 2, 1751; and to declare himſelf their founder and patron.

Under this charter they became a body corporate, by the name of the Society of Antiquaries of London, with a power to have and uſe a common ſeal, to ſue and be ſued, and to take, hold, and enjoy by purchaſe, gift, or otherwiſe, any lands, tenements, or hereditaments, not exceeding in the whole one thouſand pounds per annum. And it is therein directed, that the council of the ſaid ſociety ſhall at all times conſiſt of twenty-one perſons, the preſident, for the time being, always to be one; and Martin Folkes, Eſq; was by charter appointed the firſt preſident; and alſo twenty other perſons therein named to be the firſt council, empowering them, within two months from the date thereof, to nominate, chooſe, and admit, as fellows of the ſaid ſociety, ſuch perſons as ſhould excel in the knowledge of the antiquities and hiſtory of this and other nations, and be eminent for piety, virtue, integrity, and loyalty. This firſt preſident and council were to continue till the 23d day of April next enſuing, on which day, in every year hereafter, the council and fellows aſſembled to nominate and elect a preſident and council for the enſuing year; and it was particularly directed that eleven of the former council ſhould be continued, and ten other perſons choſen out of the members of the ſociety: ten and no more of the council being to be changed annually. The preſident is empowered to nominate four perſons of the council to be his deputies, and ſupply his place in caſe of ſickneſs or abſence; and the preſident, council, fellows, or any twenty-one or more, are empowered to make ſtatutes, rules, orders, and bye-laws, for the government and direction of the ſaid ſociety, their eſtates, goods, &c. and for the admiſſion and amoval of all and every the members and officers thereof. And the preſident, council, and fellows, may at any time appoint treaſurers, ſecretaries, and clerks, may have and employ one ſerjeant at mace, and ſuch other ſervants as they think neceſſary. And laſtly, if at any time abuſes or differences ſhould ariſe, the archbiſhop of Canterbury, the lord chancellor or keeper of the great ſeal, and the lord privy ſeal, and the two ſecretaries of ſtate for the time being, were appointed viſitors, with the full power for any three of them to compoſe and redreſs ſuch differences and abuſes: proviſion is alſo made to fill up any vacancies that ſhould happen by the death of the preſident or any of the council.

On the receipt of this charter, the firſt preſident and council nominated and admitted, by a writing dated the 14th of November 1757, all the former members, together with ſome others, in the whole one hundred and twenty one, to be fellows of the ſaid ſociety of antiquaries of London; and ſoon after drew up a body of ſtatutes for the good government thereof, which was unanimouſly agreed to and confirmed in the month of July 1752.

It was enacted, that the number of members ſhould not exceed one hundred and fifty; but that number being very ſoon filled up, and ſeveral men of quality and fortune, as well as perſons of great learning and eminence, being continually applying to become members, which they could not be till the vacancies ſhould happen by death, the ſociety thought proper in the year 1755, to enlarge their number to one hundred and eighty, (to which they are limited at preſent) excluſive of peers, privy-counſellors, and judges, that ſhould be choſen after that time. A little before this, the ſociety gave up the management of their eſtate and revenues, the payment of monies, and the publication of their papers and drawings, which before were in the body in general, and thereby attended with many inconveniencies, entirely to the care of their council, which are now a ſtanding committee for that purpoſe; and thereby the government of this ſociety is become nearly the ſame as that of the Royal Society, which was doubtleſs a proper pattern to copy after.

On the 23d of April, being St. George's day, the ſociety annually elect their council and officers, viz. a preſident, a treaſurer, two ſecretaries, and a director, who has the care of all their publications. Then the preſident appoints four of the council to be his deputies, or vice-preſidents: and after the election is over, the ſociety dine together at their own expence. Martin Folkes, Eſq; was annually elected preſident, till his death in 1754, ſince which time the Right Hon. Lord Willoughby of Parham was every year choſen till his deceaſe in 1765.

Every perſon deſirous to be elected a fellow of this ſociety, except peers, privy-counſellors, or judges of Great Britain or Ireland, muſt be recommended by three or more of the members, in a paper ſigned by themſelves, ſpecifying the name, addition, profeſſion, and chief qualification of the candidate, and alſo the place of his abode. When this has been read at one of the ſociety's meetings, and then hung up in their public room, during the time of four other meetings, the election is determined by ballot. Peers, privy-counſellors, and judges of Great Britain or Ireland, if propoſed by any ſingle member, muſt be balloted for immediately. Every new member muſt pay an admiſſion-fee of five guineas, and ſign the obligation, whereby he promiſes that he will, to the utmoſt of his power, promote the honour and intereſt of the ſociety, and obſerve the ſtatutes and orders thereof: which being done, he is led up to the chair, when the preſident or vice-preſident riſing, takes him by the hand and ſays, “I do, by the authority and in the name of “the ſociety of antiquaries of London, admit you a “fellow thereof.”

Every member muſt further pay one guinea annually for the uſe of the ſociety, or ten guineas at once in lieu of all contributions.

The meetings of this ſociety are on Thurſday evenings weekly, from about ſix till nine o'clock, at their houſe in Chancery-Lane. Their buſineſs is to receive, read, and conſider all informations from their own members, or others, concerning the antiquities of all nations; (for which purpoſe they admit eminent foreigners to be correſponding members) but they more particularly attend to the ſtudy of the ancient hiſtory, cuſtoms, manners, grants, charters, coins, medals, camps, churches, cities, and all monuments whatever, eccleſiaſtical, military, or civil, which are found in or relate to Great Britain and Ireland; and the communications they have received concerning theſe matters muſt be very valuable, as may be judged by the many curious remains of antiquity they have cauſed to be engraved on copper-plates, and permitted lately to be ſold; though as yet they have not thought fit to publiſh any of their diſſertations. They have a ſmall, but choice, library, which is increaſing daily; alſo a fine collection of prints and drawings.

ANTIQUARY, a perſon who ſtudies and ſearches after remains of antiquity.

ANTIQUE, a term moſt in uſe among architects, ſculptors, and painters: they make uſe of it to expreſs pieces of architecture, ſculpture, or painting, executed in the ages when thoſe arts were carried to the higheſt perfection, by men of the fineſt genius in Greece and Rome; that is, from the age of Alexander the Great, to the reign of the emperor Phocas, about the year of our Lord 600, when Italy was over-run by the Goths and Vandals.

Antique in this ſenſe is oppoſed to modern; thus we ſay an antique edifice, buſto, baſſo relievo, or manner; an antique model; and of a ſtatue, that it is in an antique taſte.

We have ſeveral antique pieces of ſculpture left, as the Laocoon and Venus in the poſſeſſion of the family of Medicis, the Apollo and Hercules of the houſe of Farneſe, &c.

Antique paintings are more ſcarce; we have only the wedding of Aldobrandinus, ſome little figures of the pyramid of Ceſtius, a Venus which is the palladium of Rome, and ſome ſmall pieces in freſco, preſerved out of the ruins of the baths of Titus and Heraclius.

Some ſculptors have counterfeited antiques ſo nicely as to impoſe on the judgment of the public; witneſs the famous ſtory of Michael Angelo's Cupid.

Antique is ſometimes diſtinguiſhed from ancient, which means a leſs degree of antiquity, a time when the art was not in its higheſt perfection. Some writers uſe a compound word, antique-modern, in ſpeaking of old Gothic churches, and other buildings, which they would not confound with thoſe of the Greeks and Romans.

ANTIQUITY, *Antiquitas*; we make uſe of this term to denote paſt ages.

In this ſenſe we ſay, the heroes of antiquity, traces or veſtigia of antiquity, monuments of antiquity.

We make uſe of the ſame word to expreſs what is left us of the ruins, monuments, remains, &c. of the ancients.

In this ſenſe we ſay a maſter-piece of antiquity; a fine piece of antiquity; Italy, France, and England, are full of antiquities. Antiquity is taken alſo for the ancientneſs of any thing, or the time it has ſubſiſted.

In this ſenſe we ſay, the antiquity of a kingdom, a cuſtom, or any thing of the like nature. Moſt nations pretend to a greater antiquity than they can prove. We may ſay, that the preſent time is the age of the world, and that in thoſe times which we call ancient, the world was only in its infancy.

ANTIRRHINUM, ſnap-dragon, or calf's ſnout, in botany, a genus of plants, with an anomalous flower, conſiſting of one leaf, which is divided, as it were, into two lips; the upper of which is cut into two parts, and the under into three parts: out of the flower-cup ariſes the pointal, faſtened like a nail in the hinder part of the flower, which afterwards turns to a fruit, reſembling a calf's-head, which is divided in the middle by a partition into two cells, in which are contained many ſmall ſeeds. Botaniſts enumerate twelve ſpecies of this plant. All the ſorts of ſnap-dragon are pretty ornaments in a garden, and, requiring a very little culture, are rendered more acceptable. They are all hardy plants, and will reſiſt the cold of our winters extremely well, eſpecially if they are planted on a dry, gravelly, or ſandy ſoil; for, when they are planted in a rich moiſt ſoil, they will grow very luxuriant for a while, but are very ſubject to rot in autumn or winter; and are much more ſuſceptible of cold, than when they are in a dry, hungry, rocky ſoil; they will grow in the joints of old walls, where they may be placed ſo as to make ſome abject part of the garden agreeable; for they will continue in flower for ſeveral months: and if the ſeeds are permitted to ſhed, there will be a continual ſupply of young plants, without any trouble.

Wherever thoſe plants are deſigned to grow upon walls, or on a rocky barren ſoil, the ſeeds ſhould be ſown the beginning of March, where they are deſigned to remain (for if the plants are firſt raiſed in a better ſoil, and afterwards tranſplanted into thoſe places, they ſeldom ſucceed well). When the plants are come up, they will require no other culture, but to keep them clear from weeds; and where they come up too thick, to pull ſome of them out; ſo as to give them room to grow. In July theſe ſorts will begin to flower, and will continue flowering till the froſt prevents them. Thoſe plants which grow on walls, will be ſtrong, and have woody ſtems, which will continue two or three years or more. *Miller's Gard. Dict.*

ANTISAGOGE, in rhetoric, the ſame with conceſſion. See the article CONCESSION.

ANTISCII, in geography, perſons who live on different ſides of the equator.

The word is compounded of the Greek, *αντι*, againſt, and *σκια*, a ſhadow.

ANTISCORBUTICS, among phyſicians, medicines good in all ſcorbutic caſes. See SCURVY.

ANTISEPTICS, among phyſicians, a name given to all ſubſtances that reſiſt putrefaction.

The word is formed from the Greek, *αντι*, againſt, and *σηπω*, to putrefy.

Dr. Pringle, in an appendix to his Obſervations on the Diſeaſes of the Army, has given a very curious and uſeful ſet of experiments on antiſeptics.

ANTISIGMA, among the ancient grammarians, implies a note or ſentence affixed to thoſe verſes whoſe order was to be changed.

ANTISTROPHE, in the ancient drama, implies the ſtanza repeated by the chorus to the audience on the left-hand; the word being derived from *αντι*, againſt, and *στρεφω*, to turn. Thus the ſtrophe ſignifies the ſtanza, or thoſe verſes which the chorus ſing, turning themſelves towards the ſpectators on the right hand; and the antiſtrophe means the ſame ſtanza ſung by the chorus turning themſelves towards the audience on the left. In rhetoric, the antiſtrophe or epiſtrophe ſignifies repartee; as for example, if, after having ſaid the man of ſuch a maſter, we add, and the maſter of ſuch a man; this laſt phraſe is an antiſtrophe, or expreſſion, in reply to the firſt: a famous paſſage of St. Paul, in his 2d Epiſt. to the Cor. chap. xi. v. 22, is expreſſed in this figure of rhetoric. *Εβραιοι εισι; καγω. Ισραηλιται εισι; καγω. σπερμα Αβρααμ εισι; καγω.* Are they Hebrews? ſo am I. Are they Iſraelites? ſo am I. Are they the ſeed of Abraham? ſo am I.

This is alſo a term uſed in ancient lyric poetry: among the Greeks, the antiſtrophe made one of the three parts of their ode; the other two were called the ſtrophe and epode. The ſtrophe and antiſtrophe always contained an equal number of verſes, and thoſe too of the ſame meaſure, which could conſequently be ſung to the ſame muſic: but the epode was compoſed in verſes of a different meaſure, either longer or ſhorter. The antiſtrophe was a kind of anſwer or relative echo, both to the ſtrophe and the epode; the Greeks called theſe three united, a *τριωδη*, and is the ſame thing that we ſhould call a ſong of three ſtanzas.

ANTITACTES, in eccleſiaſtical hiſtory, a name given to a branch of the Gnoſtics, who held, that God was good and juſt; but that a creature had created evil: that we are therefore to oppoſe this author of evil, in order to avenge God of his enemy.

The word is derived from the Greek, *αντιταττειν*, to oppoſe.

ANTITHENAR, in anatomy, the name of a muſcle, generally called adductor indicis. See the article ADDUCTOR *Indicis*.

ANTITHESIS, in rhetoric, a figure of ſpeech, which conſiſts in oppoſing the thoughts to each other, in order to place their oppoſite qualities in a more conſpicuous point of light.

The writings of the ancients abound with this figure. Cicero, in his oration for Cluentius, ſays, *Vicit pudorem libido, timorem audacia, rationem amentia.*

ANTITHESIS, in grammar, is a figure whereby one letter is ſubſtituted in the room of another; as when Virgil ſays *olli* for *illi*, in order to make a kind of oppoſition.

ANTITHETARIUS, a term occurring in the title of a chapter of the laws of Canutus, but not in the chapter itſelf. It ſignifies a perſon who endeavours to acquit himſelf of the crime laid to his charge, by charging his accuſer with the ſame fact.

ANTITRAGUS, in anatomy, the part of the external ear oppoſed to the tragus. See EAR and TRAGUS.

ANTITRINITARIANS, a general name given to all thoſe who deny the Chriſtian doctrine of the Trinity; but particularly applied to the Arians and Socinians.

ANTITYPE, a Greek word, properly ſignifying a type or figure. In this ſenſe St. Paul uſes the word, Heb. ix. ver. 24, where he ſays, that Jeſus is not entered in the holy of holies made with hands, which was the type of the true. Inſtead of the word type, we read in the Greek of St. Paul, antitype, which meſſieurs Port-Royal and Amelot have tranſlated type, or figure. Thus, according to the true import of the word, it ſignifies a type which anſwers to another type, or rather that which is in the place of a type.

ANTITYPE, in the Greek church, is an appellation given to the bread and wine, even after conſecration: and hence it has been argued, that they do not believe tranſubſtantiation; for otherwiſe they could not, with any propriety, call the bread and wine antitypes, figures, or ſimilitudes after conſecration.

ANTLER, among ſportſmen, implies a ſtart or branch of a deer's horn.

Brow ANTLER ſignifies the branch next the head.

Bes ANTLER, the branch next above the brow antler.

ANTŒCI, in geography, thoſe inhabitants of the earth who live under the ſame meridian, and at the ſame diſtance from the equator, the one towards the north, and the other towards the ſouth.

The word is formed from the Greek, *αντι*, oppoſite, and *οικεω*, to dwell.

The Antœci have exactly the ſame hours of the day and night, but oppoſite ſeaſons; the ſhorteſt winter's day of the one being the longeſt ſummer's day with the other; and conſequently the length of the night with the one, is equal to the length of the day with the other.

Tower of ANTONIA, in antiquity, the moſt magnificent monument which Herod the Great ever built; he gave it that name in memory of Anthony his friend: it was built on the hill of Jeruſalem formerly called Barri. The front of it was built entirely of white marble, and defended by a wall of three cubits high; the diſtance of this wall to the tower was forty cubits; within it were contrived halls, apartments, and baths. At equal diſtances were four other towers, three of which were fifty cubits high; and the fourth, which took up the ſouthern and eaſtern angles, was of ſeventy cubits. Theſe towers had galleries communicating with the temple ſtairs, from whence the Roman ſoldiers uſed to obſerve the people on feſtival days, to ſee that they did not form any dangerous enterprize.

ANTONIAN *Water*, in the materia medica, the name of a medicinal water of Germany, remarkably pleaſant to the taſte, and of ſervice in many caſes as a medicine.

It is very temperate, not too ſtrongly operating either by ſtool or urine: and hence it is a very proper drink for perſons in chronic and many acute diſeaſes, either alone, or mixed with wine, to ſupply the place of malt liquor, which is proper but in very few diſeaſes. A long uſe of it alone may alſo prove of conſiderable ſervice in hypochondriac caſes. *Hoffman's Oper.*

ANTONOMASIA, in rhetoric, a figure by which the noun appellative is uſed inſtead of a proper name, and the contrary.

The word is compounded of the Greek, *αντι*, for, and *ονομα*, a name.

Thus, becauſe Sardanapalus was a voluptuous prince, and Nero a cruel emperor, we give an epicure the name of Sardanapalus, and a barbarous prince the appellation of Nero.

ANTRUM *Highmorianum*, in anatomy, is a cavity diſcovered in the maxillary bone, called alſo ſinus maxillaris.

ANTRUM *Pylori*, in anatomy, is a large cavity at the bottom of the pylorus. See PYLORUS.

ANUBIS, in mythology, a name given to Mercury, who was worſhipped by the Egyptians under the figure of a dog.

Diodorus Siculus tells us, that Anubis, following his father Oſiris to war, bore the enſign of a dog on his ſhield; for which reaſon he was worſhipped, after his death, under the figure of a dog.

ANVIL, in mechanics, a ſmith's utenſil, on which the work is forged or hammered.

The face or uppermoſt ſurface of the anvil muſt be very flat and ſmooth, without flaws; and ſo hard that a file will not touch it. At one end is ſometimes a pike, bickern, or beak-iron, for the rounding of hollow work. The whole is uſually mounted on a firm wooden block.

Forged anvils are better than thoſe of caſt-work. Lockſmiths have alſo a ſmaller kind of anvil, called a ſtake, which is moveable, and placed ordinarily on their work-bench. Its uſe is for ſetting ſmall cold work ſtraight, or to cut or punch on with the cold chiſſel or cold punch. See the articles LOCKSMITH and SMITHERY.

ANUS, in anatomy, the extremity of the inteſtinum rectum, or orifice of the fundament. It is ſurrounded with a large quantity of fat, that it may eaſily dilate in diſcharging its contents, and is furniſhed with three muſcles, called elevatores and ſphincter. See SPHINCTER.

ANUS is alſo the name of a ſmall aperture in the third ventricle of the brain, leading to the fourth ventricle of the cerebellum.

AONIDES, in mythology, one of the many appellations of the muſes, ſo called from the Aonian mountains in Bœtia, where they were feigned to reſide.

AORASIA, in antiquity, the inviſibility of the gods.

The word is Greek, *αορασια*, and derived from *α*, priv. and *οραω*, to ſee.

The opinion of the ancients, with regard to the appearance of the gods to men, was, that they never ſhewed themſelves face to face, but were known from their backs as they withdrew: whence it followed, according to them, that every being they had time to look at in the face, was not a deity. Neptune aſſumed the form of Calchas to ſpeak to the two Ajaxes; but they knew him not till he turned his back to leave them; and diſcovered the god by his majeſtic ſtep, as he went from them. Venus appeared to Æneas in the character of a huntreſs; but her ſon knew her not till ſhe departed from him; her divinity was betrayed, if we may uſe the word, by her radiant head, her flowing robe, and her majeſtic pace.

AORISTUS, in the Greek grammar, an indefinite or indeterminate kind of tenſe, which ſometimes expreſſes the preſent time, ſometimes the future, but moſt frequently the paſt.

The word is Greek, *Αοριϛος*, and compounded of *α*, priv. and *οριζω*, to bound or limit.

AORTA, in anatomy, the great artery which riſes immediately from the left ventricle of the heart, and thence diſtributed to all parts of the body. It is divided into two grand trunks, diſtinguiſhed by the epithets aſcending and deſcending. See the article ARTERY.

APAGOGICAL *Demonſtration*, implies an indirect method of proving the truth of a propoſition, by ſhewing the abſurdity of the contrary.

The word is formed from the Greek, *απο*, from, and *αγω*, to bring, or draw.

APANAGE, or APENNAGE, in the French cuſtoms, are lands aſſigned by the ſovereign for the ſubſiſtence of his younger ſons, and which revert to the crown upon failure of male iſſue in that branch to which the lands were granted.

APARINE, gooſe-graſs, or cleavers, in botany, a plant with a ſlender fibrous root; and ſlender, quadrangular, geniculated, rough, climbing ſtalks, five or ſix feet long. At every genicula, or knee, there are from five to ſeven leaves placed like a ſtar, which are narrow, rough, and terminate in prickles. The flowers proceed from the knees towards the top, and are very ſmall, white, monopetalous, in the ſhape of bells, and divided into four ſegments, as well as the flower-cup, which turns into a dry, hard, cartilaginous fruit, covered with a thin blackiſh ſkin; and they conſiſt of two globes full of umbilicated ſeeds. It is met with almoſt every where in hedges. It is inciding and aperient, and not only promotes urine, but ſweat; two ounces of the juice have been found to be very ſerviceable in the dropſy, carrying off the water by urine.

APARTMENT, a portion, or part of an houſe, containing the neceſſary conveniencies for a perſon to reſide in it.

APATHY, among the ancient philoſophers, implied an utter privation of paſſion, and an inſenſibility of pain.

The word is compounded of *α*, priv. and *παθος*, affection.

The Stoics affected an entire apathy; they conſidered it as the higheſt wiſdom to enjoy a perfect calmneſs or tranquility of mind, incapable of being ruffled by either pleaſure or pain.

The primitive Chriſtians uſed the word to expreſs a contempt for the things of this world.

APATURIA, in antiquity, a ſolemn feaſt celebrated by the Athenians in honour of Bacchus.

APE, in natural hiſtory, the Engliſh name of an animal of the monkey kind.

It is hairy all over the body, and has ſome reſemblance to a man in the face, noſtrils, ears, and teeth. It has alſo eye-laſhes on both the eye-lids; whereas other quadrupeds have none, except on the upper. On the breaſt it has paps, and the arms are like thoſe of a man, but hairy, and he bends them as well as the feet, like a human creature. Beſides, it has hands, fingers, and nails, like thoſe of a man, but more rough and unpoliſhed. The feet are like larger hands, and are divided into fingers, or toes, of which the middle finger is the longeſt.

An ape, properly ſo called, is without a tail; and thoſe that have tails go under the name of monkeys, of which there are ſeveral kinds. See Monkey.

APEEK, in navigation, the anchor is ſaid to be apeek when ſo much of its cable is drawn or heaved into the ſhip, as to bring her ſtem perpendicular to it.

APELLITES, in eccleſiaſtical hiſtory, a ſect of Chriſtian heretics in the ſecond century, who affirmed that Chriſt received a body from the four elements, which at his death he rendered back to the world, and conſequently aſcended into heaven without a body.

APEPSY, *Apepſia*, among phyſicians, implies crudity, or a want of digeſtion.

The word is Greek, and compounded of α, priv. and πεπτω, to concoct.

APERIENS *Palpebram rectus*, in anatomy, a muſcle in the eye-lid. It ariſes ſharp and fleſhy from the profoundeſt part of the orbit, near the place where the optic nerve is tranſmitted, paſſing directly over the muſculus attollens; it becomes tendinous, as it marches over the ball of the eye; whence it ſtill grows broader and thinner, till it is inſerted into the whole ſuperior part of the upper eye-lid.

APERIENTS, in the materia medica, ſuch medicines as facilitate the circulation of the juices in their containing veſſels, by removing all obſtructions. See the article Deobstruents.

APERTURE, the opening of any thing, or a hole, cleft, or vacuant place in ſome continuous ſubject.

The word is Latin, *apertura*, and derived from *aperio*, to open.

Aperture, or Apertion, in architecture, implies ſome opening, as a door, window, chimney, &c.

There ſhould be as few apertures as poſſible; it being a maxim that every aperture or opening has a tendency to weaken the building.

Aperture, in geometry, the opening of two right lines, which, inclining towards each other, meet in a point and form an angle.

Aperture, in optics, is the hole next the object glaſs of a teleſcope, or microſcope, through which the light and image of the object come into the tube, and are thence carried to the eye; it conſiſts of a turned bit of wood, or plate of tin, with a round hole of a convenient diameter in the middle thereof: this diameter may be found experimentally by applying ſeveral circles of black ſmutted paper, each bigger than the other, upon the face of the glaſs, from the breadth of a ſtraw to ſuch as leave only a ſmall hole in the glaſs; and with each of theſe, ſeparately, view ſeveral diſtinct objects, as the moon, ſtars, &c. That through which they appear the moſt diſtinctly is to be pitched upon.

Aperture is alſo underſtood of that part of the object glaſs itſelf, which covers the former, and which is left pervious to the rays. See Telescope.

M. Auzout affirms, that he found that the apertures of teleſcopes ought to be nearly in the ſubduplicate ratio of their lengths: but Huygens, who firſt introduced the uſe of apertures, aſſures us, he found, by experience, that the aperture of an object glaſs, ex. gr. of 30 feet, is to be determined by this proportion, as 30 to 3; that is, As 10 to 1, ſo is the ſquare root of the diſtance of the focus of any glaſs, multiplied by 30, to its aperture; and the focal diſtances of the eye-glaſſes are to be proportional to the apertures.

The greater or leſs aperture of an object glaſs, it is to be noted, does not increaſe or diminiſh the viſible area of the object; all that is effected by this is, the admittance of more or fewer rays, and conſequently the more bright or obſcure appearance of the object.

Hence, in viewing Venus through a teleſcope, a much leſs aperture is to be uſed than for the Moon, Jupiter, or Saturn: becauſe her light is ſo vivid and glaring: which conſideration does a little invalidate M. Auzout's proportion, as is ſhewn by Dr. Hook. *Philoſ. Tranſ.* N°. 4.

Apertura *Tabularum*, in old law books, implies the opening a laſt will and teſtament.

APETALOSE, or Apetalous, among botaniſts, is an appellation given to ſuch plants as have no petals or flower leaves.

APEX, the vertex or ſummit of any thing. See Vertex.

APHÆRESIS, in grammar, is a figure by which a letter or ſyllable is cut off from the beginning of a word.

APHEA, in mythology, a goddeſs worſhipped by the Cretans and people of Ægina.

Aphea, before ſhe was made a deity, went by the name of Britomartis in Crete. Her paſſion for hunting attached her to the train of Diana, and dedicated her virginity to the goddeſs; to avoid the purſuit of Minos, who was deſperately in love with her, ſhe threw herſelf into the ſea, and was taken up in the nets of ſome fiſhermen. Diana rewarded her virtue with the honours of immortality. Britomartis afterwards appeared to the people of Ægina, who paid adoration to her under the name of Aphea.

APHELION, or Aphelium, in aſtronomy, that point of the earth's or a planet's orbit, in which it is the fartheſt diſtant from the ſun that it can be.

The word is Greek, formed of απο, from, and ηλιος, the ſun.

Thus, a planet being in A (plate XV. *fig.* 2.) its utmoſt diſtance from the ſun S, is ſaid to be in its aphelion.

The aphelia of all the primary planets are not at reſt; for thoſe of the planets neareſt the ſun, viz. Mercury, Venus, the Earth, and Mars, being acted upon by Jupiter and Saturn, move a ſmall matter in conſequentia, or according to the order of the ſigns; and that in the ſeſquiplicate ratio, or the ſquare roots of the cubes of the diſtances of thoſe planets from the ſun.

Hence, if the aphelion of Mars move 35 minutes in conſequentia, or according to the order of the ſigns, in 100 years, the aphelia of the Earth, Venus, and Mercury, will move, in 100 years, 18′, 36″, 11′, 27″, and 4′, 29″.

The method of finding the place of the aphelion is by obſerving ſeveral of the greater digreſſions of the planet from the ſun, till by two or three repeated obſervations it be found to remain at a ſtand.—In the Philoſ. Tranſ. N°. 128, we have a geometrical method of finding the aphelia of the planets, given by Dr. Halley.

Kepler places the aphelion of Saturn, for the year 1700, in 28°, 3′, 44″, of Sagittarius: de la Hire, in 29°, 14′, 41″. The aphelion of Jupiter in 8°, 10′, 40″, of Libra: de la Hire, in 10°, 17′, 14″. The aphelion of Mars in 0°, 51′, 29″, of Virgo: de la Hire, in 0°, 35′, 25″. The aphelion of the earth in 8°, 25′, 30″, of Cancer. The aphelion of Venus in 3°, 24′, 27″, of Aquarius: de la Hire, in 6°, 56′, 10″. And the aphelion of Mercury in 15°, 44′, 29″, of Sagittarius: de la Hire, in 13°, 3′, 40″.

The annual motion, according to Kepler, of the aphelion of Saturn, is 1′, 10″, of Jupiter, 47″, of Mars, 1′, 7″, of Venus, 1′, 18″, and of Mercury, 1′, 45″. According to De la Hire, that of Saturn is 1′, 22″, of Jupiter, 1′, 34″, of Mars 1′, 7″, of Venus, 1′, 26″, and of Mercury, 1′, 39″.

APHONIA, among phyſicians, implies a loſs of voice or ſpeech.

The word is Greek, and compounded of α, priv. and φωνη, voice.

APHORISM, a maxim, or principle of ſome ſcience; or a ſentence comprehending, in a few words, a great deal of matter.

The word is formed from the Greek, αφορισμος, and derived from αφοριζω, to chuſe, or ſeparate.

APHRODISIA, in antiquity, feſtivals in honour of the goddeſs Αφροδιτη, or Venus. There were ſeveral of theſe Aphrodiſia obſerved in divers parts of Greece; the moſt remarkable was that at Cyprus, firſt inſtituted by Cinyras, out of whoſe family certain prieſts of Venus were elected; and for that reaſon named κινυραδαι. At this ſolemnity ſeveral myſterious rites were practiſed: all who were initiated to them offered a piece of money to Venus as an harlot, and received, as a token of the goddeſs's favour, a meaſure of ſalt, and a φαλλος; the former, becauſe ſalt is a concretion of ſea water, to which Venus was thought to owe her birth; the latter, becauſe ſhe was the goddeſs of wantonneſs.

APHRODITE, a name of Venus.

The word is Greek, and derived from αφρος, foam; becauſe, according to the poets, Venus ſprung from the foam of the ſea.

APHRODITES, in natural hiſtory, a name given by ſome authors to the fineſt ſpecies of amethyſt.

The ancients had a way of diſtinguiſhing what they allowed to be gems, into ſeveral kinds, according to their degrees of colour: theſe they called ſo many ſpecies, and gave to each its particular name. This has been the occaſion of no little confuſion among the writers on theſe ſubjects, by ſeemingly enlarging the number of gems. The pæderos and gemma veneris of the ancients are the ſame ſtone with this, though many have applied theſe names to the opal.

APHRONITRE, in natural hiſtory, a name given by the ancients to a particular kind of natron, or native nitre; ſuppoſed to be the froth or ſpume emerging on the ſurface of nitre in fuſion.

The word is formed from the Greek, αφρονιτρον, and compounded of αφρος, froth, and νιτρον, nitre.

APHTHÆ, in medicine, ſmall round ſuperficial ulcers ariſing in the mouth.

The word is derived from the Greek, απτω, to inflame.

Mel roſatum, or honey of roſes, acidulated with ſpirit of vitriol, is a good medicine in the cure of the aphthæ.

APIARY, a bee-houſe, or place where bees are kept, and properly furniſhed with all the apparatus neceſſary for that purpoſe.

The word is formed from the Latin, *apis*, a bee.

Methods of making an Apiary.—When there are but few bees, it is uſual to ſet them in any corner of the garden, or court, and ſometimes in cloſes adjoining to the houſe; though ſome, for want of room without doors, have ſet them in lofts or upper rooms; but this is not ſo proper for them. If a perſon intends to have a conſiderable ſtore of bees, a ſquare plat muſt be made by itſelf, proportioned to the number of bees intended to be kept, not quite a ſquare, being rather longer extended from eaſt to weſt, but ſo contrived that they may have as much of the morning and evening ſun as poſſible. The apiary ſhould be ſecurely defended from high winds on either ſide, either naturally by hills, trees, &c. or artificially by houſes, barns, walls, &c. It is alſo to be well fenced from cattle, eſpecially hogs, and from all ſorts of fowl, their dung being very prejudicial to them; neither ſhould there be any ill ſmells, nor any poultry kept near the place. The apiary ſhould be furniſhed with ſtools or benches, of wood or ſtone; but the firſt is beſt, ſtone being hot in ſummer, and cold in winter: theſe are placed at different heights, but about twelve inches is a good height; they ſhould be ſet a little ſhelving, that the rain may run off; they ſhould alſo be two or three inches wider than the hives ſet upon them, and at leaſt five feet diſtant from the other.

To have a compleat apiary, for every ſtock of bees intended to be kept, make a cot or houſe about two feet ſquare, and two and a half high, ſet on four legs about ten inches above the ground, covered over with boards or tiles to keep off the rain, the back or north ſide being cloſed up; and the ſides, facing the eaſt and weſt, to have doors with latches and haſps to them; the fore or ſouth ſide to have a falling door to cover one half thereof, which is to be raiſed up at pleaſure; and in ſummer-time ſerves for a pent-houſe, not only to keep off the beating rains from the hives, but to defend them from the extreme heat of the ſun, which at noon-day is apt to melt the honey. The other lower half ſhould have two ſmall doors to open to either hand, which will ſerve to defend the doors or holes of the hives from injurious winds: all the doors may be faſtened in winter, when the weather is too cold; or in ſummer, when it is too hot for the bees, only making a little open ſquare at the bottom of the little doors againſt the bee-hole, that the bees may have ſome liberty to fly abroad, after the doors have been ſhut: by means of the ſide doors, eſpecially if the weſt door be made to open to the right hand, a perſon may ſit ſafe, and ſee the ſeveral workings of the bees in glaſs hives, if any ſuch are uſed; if not at theſe places he may order, view, and obſerve them better than when they ſtand on naked ſtools, and with leſs offence to the bees, and more ſecurity to himſelf.

In the winter ſeaſon, if the apiary ſtand cool, good ſweet ſtraw may be ſtuffed within the doors about the hives, to keep them warm; but extremity of cold does not hurt bees ſo much in winter as wet, from which theſe caſes beſt preſerve them; or as light, and the warm beams of the ſun, at ſuch time when there is no proviſion abroad for them, againſt which this houſe or cot is the beſt preſervative; for, when the doors are ſhut, though the ſun ſhine, yet they are inſenſible of it, the hives ſtanding ſix or eight inches within the doors; whereas, after the common way of benches or ſtools, the ſun caſts rays to their very doors, which warmth, and light together, draw them out, at the expence of their proviſions and lives together, as is evident from frequent experience, the mildeſt and cleareſt winters ſtarving and deſtroying moſt bees; when, on the contrary, the coldeſt and moſt frozen beſt ſecure them. See the article Bee.

APICES, in botany, little knobs growing on the tops of the ſtamina, or cives in the middle of flowers.

The word is Latin, being the nominative plural of *apex*.

APIOS, the knobbed-rooted Virginian liquorice vetch, in botany, a genus of plants, whoſe characters are: it has a climbing ſtalk; the leaves grow almoſt oppoſite, and faſtened, as it were, to the mid-rib; the root is tuberous.

There is, at preſent, but one ſpecies of this plant known to us, which is, apios Americana Cornuti; the American apios of Cornutus.

This plant hath large knobbed roots, which part as they grow old, by which means the plant is increaſed; for it rarely produces ripe ſeeds with us. It is hardy, and will endure the cold in the open ground, if planted on a dry ſoil; but is ſubject to rot with too much wet in winter: it dies to the root every autumn, and riſes again the ſucceeding ſpring; and will twiſt itſelf round a pole, and grow to the height of eight or ten feet, and produce, in July, fine ſprigs of flowers: it hath alſo been planted near arbours, where it hath covered them very well towards the latter end of ſummer; but is cut down with the firſt cold of autumn: and in ſevere froſts the roots are often deſtroyed, where they are not well covered with litter or tanner's bark; for want of this precaution, moſt of the roots of this plant were deſtroyed in the hard winter, 1739-40. *Miller's Dict.*

APIS, in mythology, a famous deity among the Egyptians, repreſented by an ox, with certain external marks. Into this animal, according to the Egyptians, the ſoul of the Great Oſiris retired, and withdrew itſelf from the world. He gave this creature the preference, becauſe the ox is the ſymbol of agriculture, the perfection of which this prince had very much at heart.

The ox, apis, muſt have a ſtar in the forehead; that is, a ſquare white mark, the figure of an eagle on his back, a knot under his tongue in the form of a beetle, the hair of his tail double, and a creſcent on his right flank; and the cow that bore him muſt have conceived by a clap of thunder.

As it is difficult to apprehend nature ſhould produce an animal with all theſe marks, requiſite for an apis, we muſt ſuppoſe that the prieſts took care, by impreſſing the neceſſary marks on young calves, to be provided always with one: and if it happened at any time an apis could not immediately be found, and they were obliged to put it off for ſome time, it was certainly becauſe they were very careful not to be thought guilty of the impoſition. But this artifice ſeems needleſs; people, on theſe occaſions, voluntarily ſhut their eyes. When they had found the apis, before they carried him to Memphis, they fed him forty days in a city on the Nile. Women only were permitted to ſee and wait upon him, and theſe were obliged to preſent themſelves before the divine ox in an undreſs. After theſe forty days, they put him on board a ſuperb veſſel, and brought him down the Nile to Memphis, where the prieſt received him with all imaginable pomp; they were attended by numbers of people, and children were happy who could ſmell his breath, becauſe they imagined it inſpired them with the gift of prophecy.

On his arrival at Memphis, they conducted him to the temple of Oſiris, wherein were two magnificent ſtalls: one of which was built by Pſammeticus, ſupported by ſtatues, after the manner of the Coloſſus, twelve cubits high; here he continued almoſt always ſhut up, being hardly ever ſeen but by ſtrangers, to whom he was ſhewn in a little meadow joining to the temple. If they at any time led him about the city, he was attended by officers to keep off the croud, and accompanied by young children who ſung his praiſes.

APIUM, in botany, the name of an herb called in Engliſh parſley. See PARSLEY.

APIUM *Paluſtre*, ſmallage. See the article SMALLAGE.

APOBATERION, among the ancients, implied a valedictory or farewel ſpeech, or poem, made by a perſon on his leaving his own country, or ſome other place, where he had been kindly received and entertained.

APOCALYPSE, revelation, the name of one of the ſacred books of the New Teſtament, containing revelations concerning ſeveral important doctrines of Chriſtianity.

The word is formed from the Greek, αποκαλυψις, and derived from αποκαλυπτω, to reveal, or diſcover.

This book, according to Irenæus, was written about the year 96 of Chriſt, in the iſland of Patmos, whither St. John had been baniſhed by the emperor Domitian. But Sir Iſaac Newton, with very good reaſon, places the writing this book earlier, viz. in the time of Nero. Some attribute this book to the arch-heretic Cerinthus: but the ancients unanimouſly aſcribed it to John, the ſon of Zebedee, and brother of James. This book has not, at all times, been eſteemed canonical. There were many churches in Greece, as St. Jerom informs us, which did not receive it; neither is it in the catalogue of canonical books prepared by the council of Laodicea, nor in that of St. Cyril of Jeruſalem: but Juſtin, Irenæus, Origen, Cyprian, Clemens of Alexandria, Tertullian, and all the fathers of the fourth, fifth, and the following centuries, quote the Revelations as a book then acknowledged to be canonical. The Alogians, Marcionites, Cerdonians, and Luther himſelf, rejected this book: but the proteſtants have forſaken Luther in this particular; and Beza has ſtrongly maintained againſt his objections, that the Apocalypſe is authentic and canonical.

The Apocalypſe conſiſts of twenty-two chapters. The three firſt are an inſtruction to the biſhops of the ſeven churches of Aſia Minor. The fifteen following chapters contain the perſecutions which the church was to ſuffer from the Jews, heretics, and Roman emperors. Next, St. John propheſies of the vengeance of God, which he will exerciſe againſt thoſe perſecutors, againſt the Roman empire, and the city of Rome, which he deſcribes under the name of Babylon, the great whore, ſeated upon ſeven hills. In the laſt place, the 19th, 20th, 21ſt, and 22d chapters, deſcribe the triumph of the church over its enemies, the marriage of the lamb, and the happineſs of the church triumphant.

It is a part of this prophecy (ſays Sir Iſaac Newton) that it ſhould not be underſtood before the laſt age of the world; and therefore it makes for the credit of the prophecy, that it is not yet underſtood. The folly of interpreters have been to foretel times and things by this prophecy, as if God deſigned to make them prophets. By this raſhneſs they have not only expoſed themſelves, but brought the prophecy alſo into contempt. The deſign of God was much otherwiſe: he gave this and the prophecies of the Old Teſtament, not to gratify men's curioſities, by enabling them to foreknow things; but that, after they were fulfilled, they might be interpreted by the events, and his own providence, not the interpreters, be then manifeſted thereby to the world.

There is already ſo much of the prophecy fulfilled, that as many as will take pains in this ſtudy, may ſee ſufficient inſtances of God's providence. Among the interpreters of the laſt age, there is ſcarce one of note who has not made ſome diſcovery worth knowing; and thence I gather, that God is above opening theſe myſteries.

The apocalypſe of John is written in the ſame ſtile and language with the prophecies of Daniel, and hath the ſame relation to them which they have to one another; ſo that all of them together make but one conſiſtent prophecy, pointing out the various revolutions that ſhould happen, both to the church and to the ſtate; and, at length, the final deſtruction and downfal of the Roman empire. *Newton on Prophecies.*

APOCLYSMA, in pharmacy, the ſame with rob. See the article ROB.

APOCOPE, among grammarians, a figure which cuts off a letter or ſyllable from the end of a word; as *ingeni* for *ingenii.*

The word is Greek, and compounded of απο, from, and κοπτω, to cut.

APOCRASIARIUS, in antiquity, an officer who delivered the meſſages of the emperor. He was afterwards chancellor, and kept the ſeals.

APOCRUSTICS, in pharmacy, the ſame with repellents. See REPELLENTS.

APOCRYPHA, or APOCRYPHAL *Books*, ſuch books as are not admitted into the canon of Scripture, being either not acknowledged as divine, or ſpurious.

The word is Greek, αποκρυφα, which is derived from απο, and κρυπτω, to hide or conceal.

When the Jews publiſhed their ſacred books, they only gave the appellations of canonical and divine to ſuch as they then made public; and ſuch as were ſtill retained in their archives they called apocryphal, for no other reaſon, but becauſe they were not public; ſo that they might be really ſacred and divine, though not promulged as ſuch.

Thus, in reſpect of the Bible, all books were called apocryphal which were not inſerted in the Jewiſh canon of Scripture. Voſſius obſerves, that, with regard to the ſacred books, none are to be accounted apocryphal, except ſuch as had neither been admitted into the ſynagogue nor the church, ſo as to be added to the canon, and read in public.

The proteſtants do not only reckon thoſe books to be apocryphal which are eſteemed ſuch in the church of Rome, as the prayer of Manaſſeh king of Judah, the third and fourth book of Eſdras, St. Barnabas's epiſtle, the book of Hermes, the addition at the end of Job, and the 151ſt Pſalm; but alſo Tobit, Judith, Eſther, the book of Wiſdom, Jeſus the Son of Sirach, Baruch the Prophet, the Song of the Three Children, the hiſtory of Suſanna, the hiſtory of Bell and the Dragon, and the firſt and ſecond book of Maccabees.

It is not pretended that theſe books were received by the Jews, or ſo much as known to them. None of the writers of the New Teſtament cite or mention them: neither Philo nor Joſephus ſpeak of them. The Chriſtian church was for ſome ages an utter ſtranger to theſe books. Origen, Athanaſius, Hilary, Cyril of Jeruſalem, and all the orthodox writers, who have given catalogues of the canonical books of Scripture, unanimouſly concur in rejecting theſe out of the canon. And for the New Teſtament they are divided in their opinions, whether the Epiſtle to the Hebrews, the Epiſtle of St. James, and the ſecond Epiſtle of St. Peter, the ſecond and third Epiſtles of St. John, the Epiſtle of St. Jude, and the Revelations, are to be acknowledged as canonical or not.

The proteſtants acknowledge ſuch books of Scripture only to be canonical as were ſo eſteemed to be in the firſt ages of the church; ſuch as are cited by the earlieſt writers among the Chriſtians as of divine authority, and after the moſt diligent enquiry were received, and ſo judged to be by the council of Laodicea. The ſeveral epiſtles abovementioned, and the book of Revelations, whatever the ſentiments of ſome particular perſons are or may have been of them, are allowed by all the reformed churches to be parts of the canon of the New Teſtament.

APOCYNUM, dogs-bane, in botany, a genus of plants, the leaves of which are produced oppoſite by pairs upon the branches: the flower conſiſts of one leaf, which is cut into ſeveral ſegments; from its flower-cup ariſes the pointal, which is fixed like a nail in the back part of the flower, and is afterwards changed into a fruit, which is, for the moſt part, compoſed of two capſules, or pods, which open from the baſe to the top, incloſing many ſeeds, which have a long pappous down adhering to them: to this may be added, that the whole plant abounds with a milky juice.

There are ſeveral ſorts of this plant cultivated in the curious gardens of plants, ſome of which are very beautiful, and deſerve a place in every good garden. *Miller's Dict.*

APODICTICAL *Argument*, or *Syllogiſm*, implies a clear convincing proof of a propoſition.

The word is formed from the Greek, *αποδεικνυμι*, to demonſtrate.

APODOSIS, in rhetoric, the ſame with axioſis. See Axiosis.

APODYTERIUM, in the ancient baths, the apartment where perſons dreſſed and undreſſed.

The word is Greek, *αποδυτηριον*, and derived from *αποδυω*, to undreſs.

APOGEE, *Apogæum*, in aſtronomy, that point in the orbit of a planet, which is at the greateſt diſtance from the earth.

The word is Greek, compounded of *απο*, from, and *γη*, the earth.

The apogee of the ſun is that point of the earth's orbit which is at the greateſt diſtance from the ſun; and conſequently the ſun's apogee, and the earth's aphelion, are one and the ſame point.

The quantity of the motion of the apogee may be found by comparing two obſervations thereof made at a great diſtance of time, converting the difference into minutes, and dividing it by the number of years elapſed between the two obſervations. The quotient gives the annual motion of the apogee. Thus, from an obſervation made by Hipparchus, in the year before Chriſt, 140, whereby the ſun's apogee was found 5°, 30′, of Gemini; and another made by Ricciolus, in the year of Chriſt, 1646, wherein it was found 7°, 26′, of Cancer; the annual motion of the apogee is found to be 1′, 4″. De la Hire, in Tab. Aſtron. p. 15, makes the apogee of the ſun to be in 8°, 7′, 30″, of ♋, and its annual motion 1′, 2″.

Apogee *of the Moon*. See the article Moon.

Apogee *of the Equant* is its fartheſt diſtance from the earth, or that point where the circumference of the equant is interſected by the line of the apſides, in the remoteſt part of the diameter.

The mean apogee of the epicycle is a point where the epicycle is cut above, by a right line drawn from its center, to the center of the equant, or the point of the epicycle moſt remote from the earth.

APOLLINARIAN *Games*, in antiquity, an appellation given to certain theatrical entertainments annually performed in honour of Apollo.

APOLLINARIANS, or Apollinarists, in eccleſiaſtical hiſtory, a ſect of heretics, ſo called from Apollinaris of Laodicea, their leader, who affirmed that Chriſt had neither a rational human ſoul, nor a true body; and that the ſouls of men were propagated by other ſouls, as well as their bodies.

APOLLONIA, in antiquity, an annual feſtival celebrated by the Ægialians, in honour of Apollo.

APOLLONIAN *Hyperbola* and *Parabola*. See the articles Hyperbola and Parabola.

APOLOGUE, an ingenious method of conveying inſtruction, by means of a feigned relation, called a moral fable.

The only difference between a parable and an apologue, conſiſts in this, that the former being drawn from what paſſes among mankind, requires probability in the narration; whereas the apologue being generally taken from the ſuppoſed actions of brutes, or even things inanimate, is not confined by ſuch ſtrict rules of probability.

APOLOGY, a defence or excuſe for ſome perſon, action, or the like, either by words or writing.

The word is Greek, *απολογια*, and derived from *απολογεομαι*, to defend or excuſe.

APONEUROSIS, in anatomy, the ſpreading or expanſion of a nerve or tendon, in the manner of a membrane.

The word is Greek, and compounded of *απο*, from, and *νευρον*, a nerve.

APOPHYGE, in architecture, the convex part, or ring, of a column, lying either above or below the flat member. It was originally nothing more than the ferril or ring, fixed on the extremity of a wooden pillar to prevent its ſplitting; and was afterwards imitated in ſtone.

The word is Greek, and properly ſignifies *flight*; and hence ſome architects call it the ſpring of the column.

APOPHYSIS, in anatomy, a protuberance of a bone, or a part jutting out beyond the reſt.

APOPLECTIC, ſomething that relates, or belongs to, an apoplexy.

APOPLEXY, among phyſicians, any diſorder which inſtantaneouſly deprives a man of life, who a few minutes before was, or at leaſt ſeemed to be, in perfect health; but it is uſually confined to ſuch ſudden diſorders cauſed by affections of the brain.

The word is derived from the Greek, *αποπληττω*, to ſtrike ſuddenly.

In an apoplexy the patient is ſuddenly deprived of the exerciſe of all the ſenſes, both external and internal, and of voluntary motion, whilſt the pulſe, which is generally ſtrong, remains, together with a laborious and deep reſpiration, attended with a conſiderable elevation of the breaſt, with a ſtertor, and the appearance of profound and perpetual ſleep.

A multitude of the moſt accurate obſervations have made it appear, that this diſorder ariſes from whatever cauſe is capable of preventing, either totally or in part, the influx of the nervous fluid, ſecreted, in the cerebrum, to the organs of ſenſe and voluntary motion, and the reflux of the ſame fluid from the abovementioned organs to the common ſenſory in the brain; whilſt the progreſs, and perhaps the return, of the fluid, ſupplied by the cerebellum, to and from the heart, and organs of reſpiration, is preſerved in a degree ſufficient to ſupport, in ſome meaſure, their functions.

All theſe cauſes, as obſerved and delivered by authors, may, for the greater perſpicuity, be reduced to claſſes; in the firſt of which may be reckoned,

1. The natural make of the body: thus, when the head is naturally large, the neck ſhort, and, as it ſometimes happens, conſiſting only of ſix vertebræ, whereas there ought to be ſeven, this ſtructure diſpoſes to an apoplexy, as it favours the congeſtion of blood and humours in the head. Thus alſo, if the body is corpulent and fat, the capillary arteries in general will be ſubject to compreſſion; and, in conſequence thereof, a greater quantity of blood and humours will flow into the veſſels which convey them to the brain. Thus alſo a plethoric habit, and a redundance of pituitous humours in the blood, lay a foundation for the ſtagnation of the juices, and a ſubſequent rupture of the veſſels in the brain.

2. To the ſecond claſs belong all thoſe cauſes which induce ſuch a change in the blood, lymph, and nervous fluid, as to render them incapable of circulating freely through their reſpective veſſels in the brain. Amongſt theſe are,

Polypous concretions in the carotid or vertebral arteries, whether formed originally about the heart, or within the cranium; which are diſcovered by a palpitation of the heart, an unequal pulſe, a vertigo, and temporary loſs of ſight, often recurring, and which are increaſed by motion or heat.

3. To the third claſs belongs whatever compreſſes the arteries themſelves, or the nervous veſſels of the brain, ſo as to prevent a free circulation of their reſpective fluids through them.

People who are plethoric, that is, full of blood, and bloated with bad humours, are much ſubject to this ſpecies of apoplexy; eſpecially if extraordinary motion or heat increaſe the velocity of the circulation. Hence it is apparent that the diſorder muſt be promoted in ſuch conſtitutions by high feeding and ſpirituous liquors; medicines which are acrid, and excite the motion of the blood, ſuch as cardiacs, volatiles, and emetics; by exceſſive heat and motion; and by intenſeneſs of thought, eſpecially if long continued, and frequently repeated, becauſe this determines a more copious flux of humours towards the brain.

4. To the fourth claſs belongs all thoſe cauſes, which, by any means, ſo diſſolve the texture of the arteries, veins, or lymphatic ducts, belonging to the internal part of the cerebrum, as to cauſe an extravaſation of their reſpective fluids, which then preſs upon and injure the medullary origin of the nerves of the cerebrum. Such, for example, are an acrimonious ſerum in hydropic and leucophlegmatic caſes; a redundance of blood in a plethora; an atrabiliarious acrimony prevalent in melancholy, ſcorbutic, and arthritic conſtitutions, which frequently produces an apoplexy, and uſually operates betwixt the fortieth and ſixtieth years of life. Now, all theſe may remain latent in the conſtitution for ſome time; but, upon being excited by adequate cauſes, they are frequently productive of a ſudden apoplexy; which may be foreſeen by comparing the materials ſubſiſting in the conſtitution with the cauſes capable of exciting them to action, which are principally violent affections of the mind, and intenſe ſtudies; to which, perhaps, imprudent and exceſſive venery may be added.

5. Some ſorts of poiſons, which are ſuddenly deleterious, may be ranked in the fifth claſs; but theſe may be either reduced to the ſecond, third, or fourth; or may be more properly ſaid to act upon the lungs than the brain. Amongſt theſe are the fumes of mineral ſulphurs, of charcoal, and that gas ſylveſtris, or incoercible ſpirit, which exhales from vegetable juices during fermentation.

The anatomical inſpection of bodies which have died of apoplexies, and the hiſtorical obſervation of ſuch circumſtances as occur in the treatment of ſuch caſes, furniſh us with a knowledge of theſe cauſes; and a due reflection upon theſe naturally leads us to a diſtribution of them into the preceding claſſes, which are admirably adapted to the inveſtigation of the beſt methods of cure.

As to the cure and prevention of an apoplexy, no univerſal rules can be laid down; for as the prediſpoſing and exciting cauſes, together with the parts principally affected, are various, the method of relief muſt alſo vary; and muſt be attempted before the diſorder grows inveterate, otherwiſe it will be difficult to do it with ſucceſs.

If, therefore, an apoplexy, from a glutinous, inert cold cauſe, is foreſeen from the ſigns above ſpecified, the intentions muſt be directed, firſt, to avert the preſſure of the glutinous juices from the head.

Secondly, to attenuate the glutinous viſcidity in the brain, and in the whole habit.

The preſſure on the veſſels of the brain are to be diminiſhed,

Firſt, by a derivation of the humours to other, and theſe oppoſite parts.

Secondly, by univerſal evacuations.

A derivation of the humours is effected by vapours, fomentations, and baths, applied to particular parts, by which it is intended the humours ſhould be invited; by ſuction with cupping-glaſſes, by ſinapiſms and veſicatories, among which cantharides are of great importance, as they both invite the humours to the part where they are applied, and attenuate at the ſame time; by cauſtics, iſſues, ſetons, and frictions; by ligatures made upon the large veins of the feet, legs, and thighs. To theſe may be added collutions, gargariſms, and maſticatories, which excite a diſcharge of ſaliva, and apophlegmatiſms applied to the mouth, fauces, and noſe. *Boerhaave.*

APOSIOPESIS, in rhetoric, implies the ſuppreſſing, or omitting to relate part of the ſubject.

The word is Greek, and derived from αποσιωπαω, to keep ſilence.

APOSTACY, the act of abandoning the true religion.

APOSTHUME, in ſurgery, the ſame with abſceſs. See the article Abscess.

APOSTIL, a marginal note, or remark in the margin of a work.

APOSTLE, a meſſenger ſent by ſome perſon on a buſineſs of importance; and hence the word is applied by way of eminence to imply one of the twelve diſciples commiſſioned by Chriſt to preach the Goſpel.

The word is formed from the Greek, αποςολος, and derived from αποςελλω, to ſend on a meſſage.

There are various conjectures with regard to the reaſon which induced our Saviour to make choice of twelve apoſtles; but the moſt probable is, that he did it in alluſion to the twelve patriarchs, as the founders of their ſeveral tribes; or to the twelve chief heads or rulers of thoſe tribes, of which the body of the Jewiſh nation conſiſted.

APOSTOLIC, or Apostolical, ſomething connected with, or derived from, the apoſtles.

APOSTOLICS, an early ſect of Chriſtians, who called themſelves by this name from a vain pretence of being the only men who led their lives in imitation, and after the example of the apoſtles. They condemned marriage, and pretended to have all things in common.

APOSTROPHE, in rhetoric, a figure by which the orator, in a vehement commotion, turns himſelf on all ſides, and applies himſelf to the living and the dead; to angels and to men; to inanimate objects, rocks, groves, ſtreams, &c. Thus Adam, in Milton's Paradiſe Loſt,

> O woods, O fountains, hillocks, dales, and bow'rs,
> With other echo, &c.

The word is Greek, and compounded of απο, from, and ςρεφω, to turn.

APOSTROPHE, in grammar, implies a mark placed over a letter to ſhew that a vowel is cut off; as *call'd* for *called*, *&c.*

APOTACTITES, in eccleſiaſtical hiſtory, the ſame with apoſtolics. See Apostolics.

APOTHECARY, a perſon who practiſes the art of pharmacy.

The word is formed from the Greek, αποθηκη, a ſhop.

This is a very genteel buſineſs, and has been in very great vogue of late years, there being, as has been computed, upwards of 1000 in and about London. There are, in this profeſſion, various degrees, as to employ and extent.

Some do little elſe but make up medicines according to the preſcription of the diſpenſatory (compiled by the order of the College of Phyſicians, for their direction) and of thoſe of particular phyſicians, beſides viſiting their patients.

Others not only prepare almoſt all kinds of medicines, as well galenical as chemical, but likewiſe deal in drugs, with all which they ſupply their brethren in trade; and ſo become a ſort of wholeſale dealers, as well as apothecaries.

Others, again, practiſe ſurgery, manmidwifery, and many times even officiate as phyſicians, eſpecially in the country; and often become men of very large practice, and eminent in their way. There is another branch alſo many of them fall into, which is that of curing lunatics, &c.

A youth intended for this profeſſion ſhould be a pretty good ſcholar, and have a tolerable knowledge in the Latin tongue at leaſt, that he may be the better able, in due time, to read ſome of the beſt authors who have wrote upon the ſubjects of botany, pharmacy, anatomy, and medicine; though it muſt be owned there are, at preſent, almoſt innumerable helps in our mother-tongue.

In London, they are one of the city companies, and were firſt incorporated with the grocers in the year 1606, in the reign of king James I. but not alone till 1617.

They have a hall, where there are two fine elaboratories, out of which all the ſurgeons cheſts are ſupplied with medicines for the uſe of the Britiſh navy.

In the year 1712, the 10th of queen Anne, an act paſſed for reviving and continuing ſeveral acts therein mentioned, one whereof was for exempting the apothecaries from ſerving the offices of conſtables and ſcavengers, and other pariſh and ward-offices, and from ſerving upon juries: which act was made perpetual in the 9th year of king George the Firſt.

The apothecaries in England are obliged to make up their medicines according to the formulas preſcribed in the Diſpenſatory of the College of Phyſicians, and are under an obligation to have the medicines there enumerated always ready in their ſhops; and their ſhops are liable to be viſited by the cenſors of the college, who have it in their power to deſtroy ſuch medicines as they judge not to be good.

The apothecaries of Paris make but one corporation with the merchant-grocers, which is the ſecond of the ſix corporations of merchants.

By a regulation of the 15th of October, 1631, all the apothecaries of Paris are prohibited to give any medicine to patients, unleſs by the order, and with the advice of a regular-bred phyſician, or of a perſon of the faculty; nor are they to make up any preſcription, given, or drawn up, by any perſon ſtiling himſelf an empiric phyſician, or operator.

Among the good regulations made in Denmark, that which the apothecaries are obliged to obſerve is reckoned one of the beſt; for no perſon can have leave to follow that profeſſion, unleſs he be approved of by the college of phyſicians, and confirmed by the king himſelf. There are but two apothecaries allowed for the city of Copenhagen, and but one in every other conſiderable town. The magiſtrates, attended by the doctors of phyſic, viſit their ſhops and drugs twice or thrice a year, and thoſe drugs that are either ſtale or bad are ſeized, and publicly thrown upon a dung-hill without the city; and this is a ſtain upon the character of ſuch an apothecary, that is ſcarce ever wiped off. The price of all drugs is fixed, ſo that one may, without fear of being impoſed upon, ſend even a child for any drug to an apothecary's ſhop, where nothing is ſold but what is very good, and at a reaſonable price. All drugs are ſold for ready money, and yet the apothecaries are obliged to regiſter in a book what they ſell, to whom, and by what phyſician's preſcription: ſo that there ſeldom happens any accident by poiſon, either accidentally, or with deſign; and if any ſuch thing happens, it is eaſily found out, and quickly puniſhed.

APOTHEOSIS, in antiquity, a heathen ceremony, whereby their emperors and great men were placed among the gods.

The word is Greek, and compounded of απο, and ϑεος, god.

It was one of the doctrines of Pythagoras, which he had borrowed from the Chaldees, that virtuous perſons, after their death, were raiſed into the order of the gods.

And hence the ancients deified all the inventors of things uſeful to mankind, and who had done any important ſervice to the commonwealth. Tiberius propoſed to the Roman ſenate the apotheoſis of Jeſus Chriſt, as is related by Euſebius, Tertullian, and St. Chryſoſtom. Juvenal rallying the frequent apotheoſes, introduces poor Atlas complaining that he was ready to ſink under the prodigious burden of ſo many new gods as were almoſt every day added to the heavens.

Seneca ridicules the apotheoſis of Claudius with admirable humour. Herodian, lib. 4, in ſpeaking of the apotheoſis of Severus, gives us a very curious deſcription of the ceremonies uſed in the apotheoſes of the Roman emperors.—After the body of the deceaſed emperor, ſays he, had been burnt with the uſual ſolemnities, they placed an image of wax, perfectly like him, but of a ſickly aſpect, on a large bed of ivory, covered with cloth of gold, in the veſtibule of the palace. During the greater part of the day, the ſenate ſat ranged on the left ſide of the bed, dreſſed in robes of mourning; the ladies of the firſt rank ſitting on the right ſide, in plain and white robes, without any ornaments. This laſted for ſeven days ſucceſſively, during which the phyſicians came from time to time to viſit the ſick, always making their report that he grew worſe and worſe; till at length they publiſhed that he was dead.

Upon this, the young ſenators and Roman knights took the bed of ſtate upon their ſhoulders, carrying it through the via ſacra to the old forum, where the magiſtrates uſed to diveſt themſelves of their offices. There they ſet it down between two kind of amphitheatres, in the one of which were the youth, and in the other the maidens of the firſt families in Rome, ſinging hymns ſet to ſolemn airs in praiſe of the deceaſed. Theſe hymns being ended, the bed was carried out of the city to the Campus Martius, in the middle whereof was erected a kind of ſquare pavilion, the inſide of which was full of combuſtible matter, and the outſide hung with cloth of gold, and adorned with figures of ivory, and various paintings. Over this edifice were ſeveral others, like the firſt in form and decoration, but leſs; always diminiſhing and growing leſs towards the top. On the ſecond of theſe was placed the bed of ſtate, with a great quantity of aromatic perfumes, and odoriferous fruits and herbs were ſcattered around; after which the knights made a proceſſion or cavalcade in ſolemn meaſures round the pile; ſeveral chariots alſo ran round it, thoſe who conducted them being dreſſed in purple robes, and bearing images of the greateſt Roman emperors and generals.

As ſoon as this ceremony was ended, the new emperor came to the catafalco or pile, with a torch in his hand; and at the ſame time fire was ſet to it on all ſides, the ſpices and other combuſtibles kindling all at once.

While this was doing, they let fly from the top of the building an eagle, which, mounting into the air with a firebrand, carried with it, as they believed, the ſoul of the dead emperor into heaven; and he was accordingly ranked among the gods. For this reaſon the medals on which apotheoſes are repreſented, have generally either an altar with fire upon it, or an eagle taking its flight towards heaven.

APOTOME, in mathematics, the remainder or difference of two incommenſurable quantities.

The word is derived from the Greek verb, αποτεμνω, to cut off.

Euclid calls an apotome a line BC (plate XV. *fig.* 3.) which is the difference between a rational line AC, and a line AB only commenſurable in power to the whole line AC, and may be expreſſed thus, ſuppoſing ($AC=a$, and $AB=b$) viz. $a-\sqrt{b}$, or in numbers $2-\sqrt{3}$, a being 2, and b, 3. Hence the difference between the ſide of a ſquare and its diagonal will be an apotome; for if s repreſents the ſide of the ſquare, $\sqrt{2ss}$ will repreſent the diagonal, and conſequently $\sqrt{2}\times s-s$ or $\overline{\sqrt{2}-1}\times s$ will be the difference between two quantities, one a rational quantity, and the other an irrational one, that are only commenſurable in power. It follows alſo that the difference between the ſide $AC=2$ of an equilateral triangle ABC, and the perpendicular $BD=\sqrt{3}$ will be an apotome, viz. $=2-\sqrt{3}$.

The doctrine of apotomes is a very uſeful ſubject; it ſerves to ſhew the poſſibility or impoſſibility of the quadratures of curve-lined figures, and illuſtrates the lineal ſolutions of Diophantus's problems, and others of the like kind. Euclid, in his Elements, makes uſe of this method to ſhew the nature of the five regular bodies, which by Plato and his ſect (of which Euclid's was one) were held in great eſteem. And in the laſt age, Kepler (in his *Myſteria Coſmographica*) would have the number of the planets and the magnitudes of the ſyſtems of the world to ariſe from theſe bodies.

APOZEM, in pharmacy, the ſame with decoction. See Decoction.

APPANAGE. See the article Apanage.

APPARATOR. See Apparitor.

APPARATUS, a term uſed to denote a complete ſet of inſtruments, or other utenſils, belonging to any artiſt or machine: thus we ſay a ſurgeon's apparatus, a chemiſt's apparatus; the apparatus of the air-pump, microſcope, &c.

APPARENT, in a general ſenſe, implies whatever is evident to the eye or underſtanding.

Apparent *Altitude*. See the article Altitude.

Apparent *Conjunction*, in aſtronomy, is when the right line connecting the centers of two planets, &c.

does not paſs through the center of the earth, but thro' the eye of a ſpectator ſituated on its ſurface.

APPARENT, or *ſenſible Horizon*, is that great circle which limits our ſight, or the place where the heavens and the earth ſeem to meet.

APPARENT *Magnitude* of an object, is the magnitude thereof, ſuch as it appears to the eye.

The apparent or ſeeming magnitude is meaſured by the optic angle.

Thus the apparent magnitude of an object is ſaid to be ſo many degrees as the optic or viſual angle ſubtends. Let DC (plate XV. *fig.* 4.) be an object viewed by the eye at A and B, then the angle CAD is the apparent magnitude of that object ſeen at A; and the angle CBD, its apparent magnitude, when viewed at B.

All things appear the leſs, the more remote they are; and it is found by experience, when their diſtance becomes ſo great that the apparent magnitude is no more than an angle of one ſecond, they will be ſo ſmall as to appear but like a point, and become inviſible.

APPARENT *Diameter*, in aſtronomy, is the angle under which we ſee the ſun, moon, and ſtars; as when the ſun S (plate XV. *fig.* 5.) appears under the angle DOE. This angle is the apparent diameter.

The beſt way of finding the apparent diameters of the celeſtial luminaries is by a micrometer fixed in the focus of a teleſcope. See MICROMETER.

The apparent diameter of the ſun may be obtained by taking the meridian altitudes of his upper and lower limbs with a good quadrant and teleſcope fitted to it, and afterwards taking their difference, which will be his apparent diameter ſeen from the earth. Another way is by erecting two perpendicular threads over the meridian line, and, while the eye is at reſt, obſerving the ſun's paſſage over the meridian; and noting the inſtant that the limb of the ſun comes to the threads, by an accurate time-keeper or clock, and the inſtant that its oppoſite limb leaves them, the difference is the time wherein the diameter of the ſun is paſſing over the meridian; which if the ſun be in the equator, this time turned into minutes of a degree, will be the angle under which the ſun appears: but if the ſun be out of the equator, the arch found is part of that parallel circle the ſun moves in, which muſt be turned into minutes, &c. of the equator.

The apparent diameter of the ſun is obſerved to be leaſt when he is in Cancer, and greateſt when in Capricorn.

In the moon there is a two-fold increaſe and decreaſe of the apparent diameter, the one when ſhe is in conjunction with the ſun, and the other when in her quadratures.

The greateſt apparent diameter of the ſun, according to Caſſini, is 32′, 10″, and the leaſt 31′, 38″—According to De la Hire, the greateſt is 32′, 43″, and the leaſt 31′, 38″.—The greateſt apparent diameter of the moon, according to Kepler, is 32′, 44″, and the leaſt 30′, 00″. And according to De la Hire, the one is 33′, 30″, and the other 29′, 30″. See SUN and MOON.

The apparent diameter of Saturn's ring, according to Huygens, is 1′, 8″, when leaſt.

The apparent diameters of the other planets ſee under the article DIAMETER.

APPARENT *Diſtance* is that diſtance we judge an object to be from us when ſeen afar off, being generally very different from the true diſtance, becauſe we are apt to think that all very remote objects, whoſe parts cannot well be diſtinguiſhed, and which have no other object in view near them, to be at the ſame diſtance from us, tho' perhaps they may be thouſands of miles, as in the caſe of the ſun and moon.

APPARENT *Motion, Time, &c.* See MOTION, TIME, &c.

APPARENT *Place of any Object*, in optics, is that wherein it appears when ſeen through one or more glaſſes. See LENS.

APPARENT *Place of the Image of an Object*, in catoptrics, is that which the image of an object, made by the reflection of a ſpeculum, appears to be in.

APPARENT *Place of a Planet*, in aſtronomy, is that point upon the ſurface of the ſphere where we ſee the center of the ſun, moon, or ſtars, from the ſurface of the earth.

APPARITION, in a general ſenſe, implies ſimply the appearance of any object.

APPARITION, in aſtronomy, ſignifies a ſtar, or other heavenly object, becoming viſible, which before was below the horizon.

Circle of perpetual APPARITION, in aſtronomy, is a great circle of the ſphere, whoſe plane is perpendicular to a right line drawn from the center of the ſun to that of the earth; this circle is the boundary of the enlightened hemiſphere of the earth, in the different points of its orbit.

Circle of Perpetual APPARITION, in geography, is a ſmall circle of the ſphere deſcribed about the pole as a center, and touching the northern point of the horizon in north latitude, and the ſouth point in ſouth latitude. All ſtars included in this circle never ſet, but are always viſible above the horizon.

APPARITOR, among the Romans, a general term to comprehend all attendants of judges and magiſtrates appointed to receive and execute their orders. Apparitor, with us, is a meſſenger that ſerves the proceſs of a ſpiritual court, or a beadle in an univerſity, who carries the mace.

APPAUMEE, in heraldry, denotes one hand extended with the full palm appearing, and the thumb and fingers at full length.

APPEAL, in law, the removal of a cauſe from an inferior to a ſuperior court or judge, when a perſon thinks himſelf aggrieved by the ſentence of the inferior judge. Appeals lie from all the ordinary courts of juſtice to the houſe of lords. In eccleſiaſtical caſes, if an appeal is brought before a biſhop, it may be removed to the archbiſhop; if before an archdeacon, to the court of arches; and thence to the archbiſhop; and from the archbiſhop's court to the king in chancery.

APPEAL, in common law, is taken for the accuſation of a murderer by a perſon who had intereſt in the party killed, or of a felon by an accomplice. It is proſecuted either by writ or by bill: by writ, when a writ is purchaſed out of the chancery by one perſon againſt another, commanding him to appeal ſome third perſon of felony, and to find pledges for doing it effectually; by bill, when the perſon himſelf gives in his accuſation in writing, offering to undergo the burden of appealing the perſon therein named.

APPEARANCE, in a general ſenſe, the exterior ſurface of a thing, or that which immediately ſtrikes the ſenſes.

APPEARANCE, in law, ſignifies a defendant's filing a common or ſpecial bail, on any proceſs iſſued out of a court of judicature. In actions by original, appearances are entered with the filazer of the county; and by bill, with the prothonotary.

In perſpective, appearance is the projection of a figure or body on the perſpective plane. In optics, direct appearance is the ſight of any object by direct rays, without refraction or reflection.

In aſtronomy it ſignifies the ſame as phænomena or phaſes; and in phyſiology, the ſame as phaſmata.

APPELLANT, in a general ſenſe, one who appeals. See the article APPEAL.

APPELLANTS, in church hiſtory, an appellation given to ſuch of the Roman catholic clergy as appeal from the conſtitution Unigenitus to a general council.

APPELLATIVE, in grammar, a noun which is applicable to a whole ſpecies or kind, as man, horſe, in contradiſtinction to a proper noun. See NOUN.

APPELLEE, among lawyers, the perſon againſt whom an appeal is brought. See the article APPEAL.

APPENDANT, in law, any thing that is inheritable belonging to ſome more worthy inheritance, as an advowſon, common, or court, may be appendant to a manor, land to an office, &c. but land cannot be appendant to land, for both are corporeal inheritances, and one thing corporeal cannot be appendant to another.

APPENDICULAR *Vermiformis*, in anatomy, a name by which ſome call the cœcum. See the article CŒCUM.

APPENDIX, in literature, a treatiſe added at the end of a work, to render it more complete. See the article SUPPLEMENT.

APPENDIX, in anatomy, the ſame with epiphyſis. See EPIPHYSIS.

APPETITE, *Appetitus*, in a general ſenſe, the deſire of enjoying ſome object, ſuppoſed to be conducive to our happineſs. When this inclination is guided by reaſon, and proportioned to the intrinſic value of the object, it is called rational appetite; as, on the other hand, it is denominated ſenſitive appetite, when we have only a blind propenſity to a thing, without determinate ideas of the good qualities for which we deſire it.

APPETITE, in medicine, a certain painful or uneaſy ſenſation, always accompanied with a deſire to eat or drink.

An exceſſive appetite is called by phyſicians bulimy, or fames canina; a defect or loſs of it, anorexy; and that after things improper for food, pica. See the articles BULIMY, ANOREXY, &c.

APPLE, a well known fruit, of a roundiſh figure, of conſiderable uſe both as a food, a remedy, and likewiſe yielding cyder.

The apple is compoſed of four diſtinct parts, viz. the peel, the parenchyma, the branchery, and the core.

The peel or ſkin is only a dilatation of the outermoſt ſkin or rind of the bark of the branch on which it grew.

The parenchyma or pulp, as tender and delicious as it is found, is only a dilatation, or, as Dr. Grew calls it, a ſwelth, or ſuperbience of the inner part of the bark of the branch.

This appears not only from the viſible continuation of the bark from the one, through the pedicle or ſtalk to the other, but alſo from the ſtructure common to both, as being both compoſed of bladders; with this only difference, that whereas, in the bark, the veſiculæ are ſpherical, and very ſmall, ſcarce exceeding one ſixteenth part of an inch in diameter; in the pulp they are oblong, and very large, generally meaſuring one-third of an inch in length; but all uniformly ſtretched out by the arching of the veſſels from the core towards the circumference of the apple.

The branchery or veſſels are only ramifications of the woody part of the branch ſent throughout all the parts of the parenchyma, the greater branches being made to communicate with each other by inoſculations of the leſs. The main branches are uſually twenty; ten of them diſtributed through the parenchyma, moſt of which march themſelves towards the cork or ſtool of the flower, the other ten, running from the ſtalk in a directer line, at laſt meet the former at the cork, and are there inoſculated with them. To theſe branches the coats of the kernels are faſtened. Moſt of the branches were originally extended beyond the fruit, and inſerted into the flower for the due growth thereof; but when the fruit afterwards grew to a head, and thus intercepted the aliment before ſent to the flower, this latter being ſtarved and falling off, the ſervice of the ſaid branches became wholly appropriated to the fruit, fifteen to the pulp, and five to the ſeed. The apple core is originally from the pith of the branch; the ſap of which finding room enough in the parenchyma, through which to diffuſe itſelf, quits the pith, which by this means hardens into a core.

All the ſorts of apples are propagated by grafting or budding upon the ſtocks of the ſame kind; for they will not take upon any other ſort of fruit-tree. In the nurſeries there are three ſorts of ſtocks generally uſed to graft apples upon: the firſt are called free-ſtocks; theſe are raiſed from the kernels of all ſorts of apples indifferently; and theſe are alſo termed crab-ſtocks; for all thoſe trees which are produced from the ſeeds before they are grafted, are termed crabs without any diſtinction: but, as I before obſerved, I ſhould always prefer ſuch ſtocks as are raiſed from the kernels of crabs, where they are preſſed from verjuice; and I find ſeveral of the old writers on this ſubject of the ſame mind. Mr. Auſtin, who wrote an hundred years ago, ſays, the ſtock which he accounts beſt for apple grafts, is the crab; which is better than ſweeter apples, and will make fruits more ſtrong and hardy to endure froſts; and it is very certain, that, by frequently grafting ſome ſorts of apples upon free-ſtocks, the fruits have been rendered leſs firm and poignant, and of ſhorter duration.

The ſecond ſort of ſtock is the Dutch creeper: theſe are deſigned to ſtint the growth of the trees, and keep them within compaſs for dwarfs or eſpaliers.

The third ſort is the paradiſe apple, which is a very low ſhrub, ſo only proper for trees which are kept in pots by way of curioſity; for theſe do not continue long.

Some perſons have made uſe of codlin-ſtocks for grafting of apples, in order to ſtint their growth: but as theſe are commonly propagated by ſuckers, I would by no means adviſe the uſe of them; nor would I chooſe to raiſe the codlin-trees from ſuckers, but rather graft them upon crab-ſtocks; which will cauſe the fruit to be finer, laſt longer, and have a ſharper flavour: and theſe trees will laſt much longer ſound, and never put out ſuckers, as the codlins always do; which, if not conſtantly taken off, will weaken the trees, and cauſe them to canker; and it is not only from the root, but from the knots of their ſtems there are generally a great number of ſtrong ſhoots produced, which fill the trees with uſeleſs ſhoots, and render them unſightly, and the fruit ſmall and crumpled.

The method of raiſing ſtocks from the kernels of crabs or apples is, to procure them where they are preſſed for verjuice or cyder; and, after they are cleared of the pulp, they may be ſown upon a bed of light earth, covering them over about half an inch thick with the ſame light earth: theſe may be ſown in November or December, where the ground is dry; but in wet ground, it will be better to defer it till February; but then the ſeeds ſhould be preſerved in dry ſand, and kept out of the reach of vermin; for if mice or rats can get to them, they will devour the ſeeds: there ſhould alſo be care taken of the ſeeds when they are ſown, to protect them from theſe vermin, by ſetting of traps to take them, &c. In the ſpring, when the plants begin to appear, they muſt be carefully weeded; and if the ſeaſon ſhould prove dry, it will be of great ſervice to water them two or three times a week; and, during the ſummer, they muſt be conſtantly kept clear from weeds; which, if ſuffered to grow, will ſoon over-top the plants, and ſpoil their growth: if theſe thrive well, they will be fit to tranſplant into the nurſery the October following; at which time the ground ſhould be carefully digged, and cleanſed from the roots of all bad weeds: then the ſtocks ſhould be planted in rows three feet aſunder, and the plants one foot diſtance in the rows, cloſing the earth pretty faſt to their roots: when the ſtocks are tranſplanted out of the ſeed-bed, the firſt autumn after ſowing, they need not be headed; but, where they are inclined to ſhoot downward, the top-root muſt be ſhortened, in order to force out horizontal roots. If the ground is pretty good in which the ſtocks are planted, and the weeds conſtantly cleared away, the ſtocks will make great progreſs; ſo that thoſe which are intended for dwarfs, may be grafted the ſpring twelvemonth after they are planted out of the ſeed-beds: but thoſe which are deſigned for ſtandards will require two years more growth, before they will be fit to graft; by which time they will be upwards of ſix feet high. The other neceſſary work to be obſerved in the culture of theſe trees, while they remain in the nurſery, will be enumerated under that article. See NURSERY. *Miller's Gard. Dict.*

APPLICATION, in a general ſenſe, implies the laying two things together, in order to diſcover their agreement.

APPLICATION *of one Science to another*, ſignifies the uſe we make of applying the principles and truths belonging to one ſcience, to complete or advance another.

APPLICATION *of Algebra to Geometry*, implies the ſolving geometrical problems by the aſſiſtance of algebra.

As the line, the ſurface, and the ſolid, objects of geometry are commenſurable magnitudes, it is very natural to think that, as algebra and analyſis were wholly employed in the calculation of magnitudes, and diſcovering unknown quantities from proper data, they might be applied with very great advantage to geometry. But however natural and eaſy this application may appear, Des Cartes was the firſt that ever knew it, though algebra had been very greatly improved by ſeveral perſons, eſpecially Vieta.

Des Cartes firſt taught us to expreſs the nature of curves by equations, to reſolve geometrical problems by theſe curves, and, in ſhort, to demonſtrate theorems in geometry by the help of algebraical calculation, when it would be too laborious to demonſtrate them by the common methods. See the articles CURVE and *Conſtruction of* EQUATIONS.

APPLICATION *of Geometry to Algebra*.—The application of geometry to algebra is not ſo common as the application of algebra to geometry, but ſometimes takes place: for as we repreſent geometrical lines by equations, ſo we may repreſent numerical quantities, expreſſed by algebraical ſymbols, by geometrical lines; and by this means ſometimes diſcover a more eaſy method of demonſtration and ſolution.

APPLICATION *of Geometry and Algebra to Mechanics*.—This is founded on the ſame principles as the application of algebra to geometry. It conſiſts chiefly in repreſenting the curves which bodies deſcribe in their motion by equations, in determining the equation between the ſpaces which bodies generate, (when acted upon by any powers whatever) and the time they take to paſs through theſe ſpaces, &c. We cannot indeed compare two things of a different nature together, ſuch as ſpace and time; but we may compare the proportion of time with the parts of ſpace paſſed over. Time in its nature flows uniformly, and mechanics imply the ſame uniformity.

Further, without knowing time in itſelf, and having any exact meaſure of it, we cannot repreſent it more clearly, with reſpect to its parts, than by the parts of an infinite right line. Now the proportion between the parts of ſuch a body, moved in whatever manner, may always be expreſſed by an equation. Let us ſuppoſe a curve, the abſciſſæ of which repreſent the portions of time paſt ſince the beginning of the motion, the correſponding ordinates denoting the ſpaces paſſed through during theſe portions of time. The equation of this curve will expreſs, not only the proportion of the time to the ſpace, but, if we may ſpeak ſo, the proportion of the proportion that the parts of time have to their unity, to that which the parts of ſpace paſſed through have to theirs; for the equation of a curve may be conſidered either as expreſſing the proportion of the ordinates to the abſciſſa, or as the equation between the proportion that the ordinates have to their unity, and that which the correſponding abſciſſa have to theirs.

It is evident then, that by the bare application of geometry and calculation, we may account for the general properties of motion, varied by any law whatever, without the help of any other principle. In the article ACCELERATED *Motion*, may be ſeen an example of geometry applied to mechaniſm; the time of the deſcent of a gravitating body is there repreſented by the perpendicular of a triangle, the velocity by the baſe, and the ſpaces paſſed through by the area of the parts of the triangle.

APPLICATION *of Geometry and Algebra to Phyſics*.—This we owe to Sir Iſaac Newton, as we owe the application of algebra to geometry to Des Cartes, and it is founded on the ſame principles. The properties of bodies in general have between each other certain proportions, which we may compare with each other, more or leſs diſtinguiſhable; and theſe we can diſcover by geometry or algebra. On this are founded all the phyſico-mathematical ſciences. One ſingle obſervation or experiment often demonſtrates a whole ſcience. As for example: The bare knowledge of this, that the angle of incidence is equal to the angle of reflexion, which is known to be true, contains the whole ſcience of catoptrics. This principle of the equality of angles being once admitted, catoptrics becomes a ſcience purely geometrical, becauſe it is reduced to comparing angles with given lines of poſition. The thing is the ſame in many other caſes. By the help of geometry and algebra, we can in general determine the power of one effect, which depends on another better known. This ſcience, therefore, is almoſt always neceſſary to compare and examine the facts experiments diſcover to us. It muſt be owned, however, that every ſubject of phyſics is not equally capable of the application of geometry. Several experiments admit of no calculation at all; ſuch are thoſe of the magnet, electricity, and many others; in theſe caſes we muſt forbear applying to. Geometricians, however, are apt to run into this fault, by advancing hypotheſes on experiments, and proceeding to calculations according to theſe hypotheſes; but theſe calculations ought no farther to be regarded, than as the hypotheſes on which they are ſupported are conformable to nature; and, therefore, obſervations ought to confirm them, which unfortunately ſometimes does not happen. Beſides, ſuppoſing the hypotheſes true, they are not always ſufficient. If there be in an effect a great number of circumſtances owing to ſeveral cauſes, which act all together, and we content ourſelves with conſidering ſome of theſe cauſes only, which, being more ſimple, can be calculated more eaſily; we may gain a partial effect of theſe cauſes; but it will be very different from the total effect which would reſult from uniting all the cauſes.

APPLICATION *of a geometrical Method in Metaphyſics*.—Geometry has been ſometimes abuſed in phyſics by applying the calculation of the properties of bodies to arbitrary hypotheſes. A geometrical method has alſo been miſapplied in ſciences, which in their own nature ſubmit to no calculation, I mean the method only, not the ſcience. Several metaphyſical writers, who have publiſhed certain truths, have yet, copying after the manner of geometricians, ridiculouſly enough ſwelled their page with the pompous words axiom, theorem, corollary, &c.

The authors of theſe works certainly imagined that theſe words, by ſome ſecret charm, compoſed the eſſence of a demonſtration; and that by writing at the end of a propoſition that it might be demonſtrated, they ſhould make that demonſtrable which was not really ſo. Geometry does not owe its certainty to this method, but to the evidence and ſimplicity of its object: and though a treatiſe on geometry, when diveſted of its ordinary terms, may be very good; yet a treatiſe on metaphyſics may be often very bad, by the affectation of following a geometrical method. We ought even to diſtruſt this claſs of writers; for the generality of their pretended demonſtrations are only founded upon an abuſe of words.

Thoſe who have conſidered theſe things, know how common and eaſy the abuſe of words is, eſpecially in metaphyſical ſubjects. It is in this particular the ſchoolmen have excelled; and it is pity they made no better uſe of their ſagacity.

APPLICATION *of Metaphyſics to Geometry*.—Metaphyſics are ſometimes miſapplied in geometry, as well as geometry in metaphyſics proper to itſelf, which is certain and inconteſtable; becauſe the geometrical propoſitions which reſult from it, afford an evidence which demands our aſſent. But as mathematical certainty ariſes from the ſimplicity of its objects, its metaphyſics too muſt be extremely ſimple and clear; muſt always be capable of being reduced to perfect ideas, without any obſcurity. In ſhort, how can the conſequences of any thing be certain and evident, if the principles are not ſo? Yet ſome authors have thought themſelves able to introduce into geometry a kind of metaphyſics, often obſcure; and, what is ſtill worſe, have affected to demonſtrate, metaphyſically, truths which have been already eſtabliſhed on other principles: this ſurely was the way to render thoſe truths doubtful, if they could poſſibly be ſo. The new geometry has principally occaſioned this falſe method. By conſidering parts infinitely ſmall as real quantities, and admitting ſome of theſe to be greater and ſome leſs, they have acknowledged an infinity of ſmall particles of different claſſes; and looked on them as real ſomethings, inſtead of endeavouring to reduce theſe ſuppoſitions and calculations to ſimple ideas.

Another abuſe of methaphyſics in geometry conſiſts in confining metaphyſics to geometrical demonſtrations. Admitting even the metaphyſical principles we ſet out upon to be certain and evident, there are ſcarce any geometrical theorems that can be accurately demonſtrated by their help alone; they almoſt always require lines and calculations: this manner of demonſtration is very material, becauſe it is in ſhort the only ſure and certain method; ſince with our pens, not metaphyſical reaſonings, we can make combinations and certain calculations.

Fig. 1.

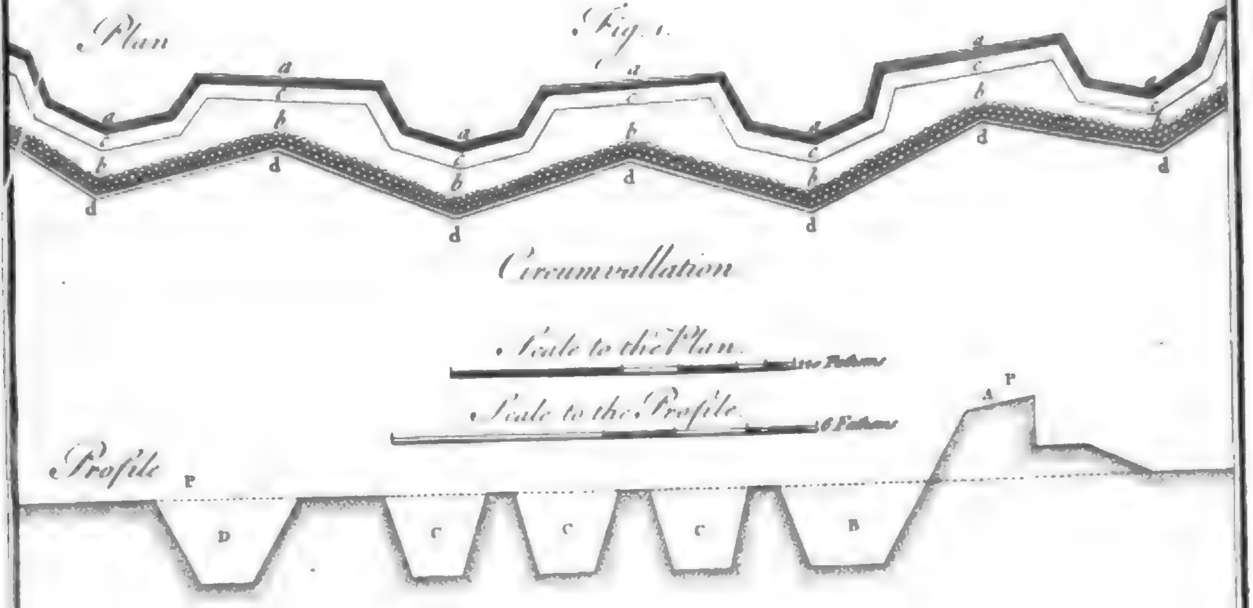
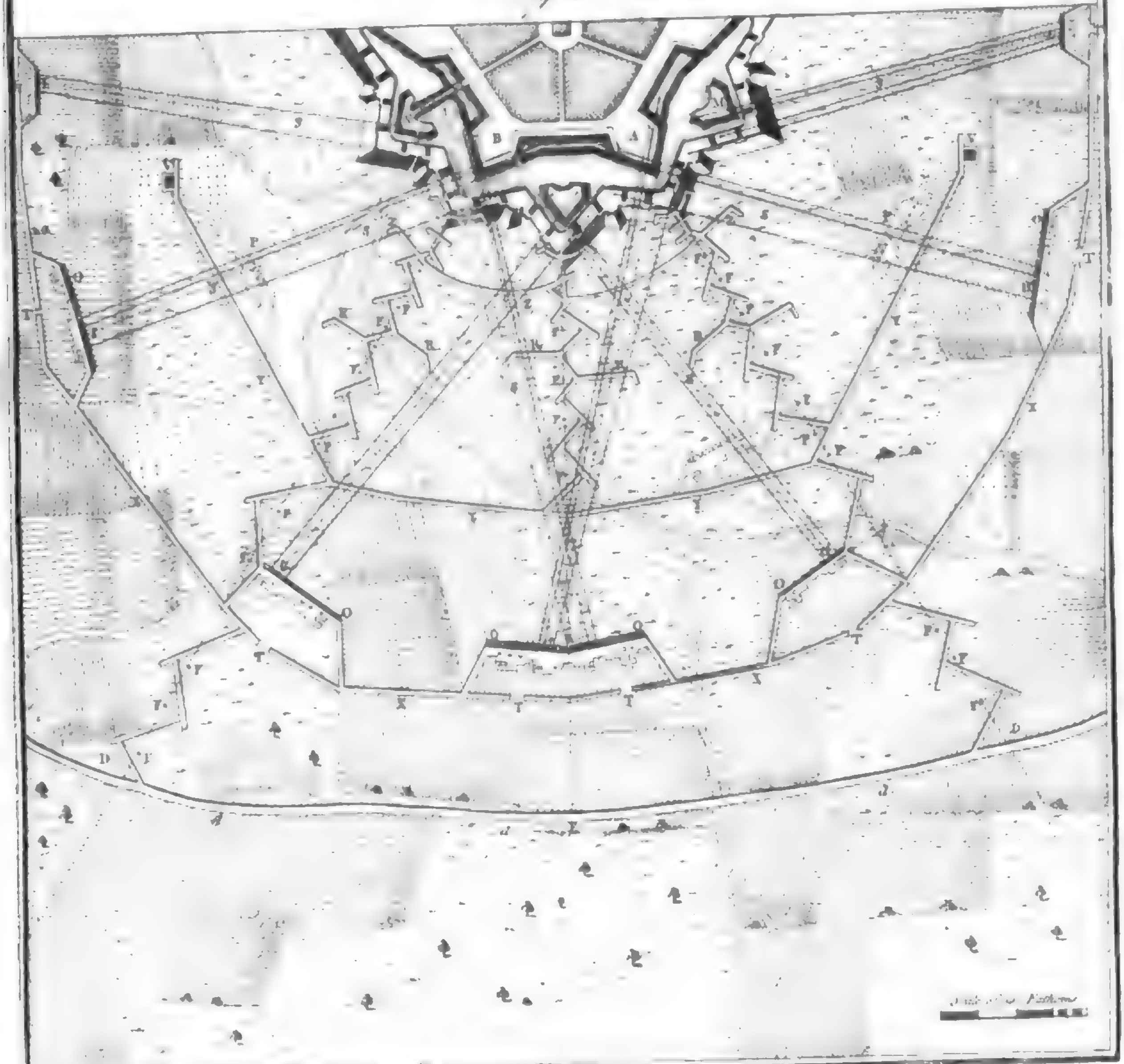

Plan
a
a
a
a
a
c
c
c
c
c
b
b
b
b
b
d
d
d
d
d
Circumvallation
Scale to the Plan
100 Fathoms
Scale to the Profile
6 Fathoms
Profile
P
A
P
D
C
C
C
B

Fig. 2 Attack


A
B
S
S
S
S
P
V
V
O
O
O
O
O
T
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T
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T
X
X
X
Y
Y
D
D
d
d
Fathoms

This latter kind of metaphyſics, which we have been ſpeaking of, is however uſeful to a certain degree, provided we do not confine ourſelves too much: it makes us carefully examine the principles of diſcoveries; it furniſhes us with lights; it points out to us the road; but we are not ſure of being right, if we may be allowed the expreſſion, without the ſtaff of calculation to point out the proper objects which we before ſaw confuſedly.

One would think great geometricians ought always to be excellent metaphyſicians; at leaſt in the objects of their ſcience. This is not however always the caſe: ſome geometricians are like people who poſſeſs a ſenſe of ſeeing, contrary to that of feeling; this proves yet more how neceſſary calculation is in geometrical truths. One may venture to affirm, that the geometrician who is a bad metaphyſician in the objects he applies himſelf to, will in others be intolerable: though geometry, whoſe object is the menſuration of body and matter, may in ſome caſes be applied to thought.

APPLICATION *of one Thing to another* is a term made uſe of to denote the ſervice the firſt is of to underſtand or bring the ſecond to perfection. Thus the application of the cycloid to pendulums ſignifies the uſe made of the cycloid to bring pendulums to perfection.

APPOGIATURA, in muſic, implies a ſmall note inſerted by practical muſicians between two others at ſome diſtance.

APPORTIONMENT, in law, the diviſion of a rent into parts, in the ſame manner as the land out of which it iſſues is divided.

APPOSITION, in grammar, ſignifies the placing two or more ſubſtantives together in the ſame caſe, without any conjunction copulative between them.

APPOSITION, among naturaliſts, is the ſame with juxta-poſition. See the article JUXTA-POSITION.

APPRAISING, the act of valuing or ſetting a price upon goods.

APPREHENSION, in logic, the firſt or moſt ſimple act of the mind, whereby it perceives or is conſcious of ſome idea. See the article PERCEPTION.

APPREHENSION, in law, implies the ſeizing a criminal in order to bring him to juſtice.

APPRENTICE, a young perſon bound by indenture to ſome tradeſman, in order to be inſtructed in his myſtery or trade.

APPROACH, the acceding or advancing of two objects towards each other.

APPROACHES, in fortification, the works thrown up by the beſiegers, in order to get nearer a fortreſs without being expoſed to the fire of the enemy's cannon; ſuch in particular are the trenches carried on in a zigzag form, connected by parallels or lines of communication. See the article ATTACK.

The lines of approach are repreſented on plate V. *fig.* 2. extending from D, D, towards the baſtions A, B.

APPROACHING, in gardening; ſee the article GRAFTING *by Approach*.

APPROPRIATION, the annexing a benefice to the proper and perpetual uſe of a religious houſe, biſhopric, college, &c.

APPROVER, in law, implies a perſon who, having been concerned in committing a felony, accuſes one or more of his accomplices.

APPROXIMATION, in arithmetic and algebra, is the method of approaching ſtill nearer and nearer to the quantity ſought, without a poſſibility of finding it exactly.

The word is Latin, *approximatio*, and compounded of *ad*, to, and *propinque*, to approach.

For the ſeveral methods of approximation ſee EXTRACTION, EQUATION, CIRCLE, SERIES, &c.

APPUI, in the menage, implies the ſenſe of the action of the bridle in the horſeman's hand.

APPULSE, in aſtronomy, the approach of a planet towards a conjunction with the ſun, or any of the fixed ſtars.

APPURTENANCES, in common law, ſignify whatever things belong to another thing as principal: as hamlets, fiſheries, &c. to a manor; ſeats in a church to houſes, &c.

APRICOT-TREE, *Armeniaca Malus*, in gardening and botany, a fruit-bearing-tree, with roundiſh acuminated leaves, ſerrated on the edges, and four or five of them placed together. The flowers that come out early in the ſpring, before the leaves, are roſaceous, conſiſting of five whitiſh petals, diſpoſed in a ring, with a calyx divided into five ſegments, from which a piſtil ariſes that turns to a fleſhy ſucculent fruit, very well known. There are ſeven ſorts cultivated in the Engliſh gardens, which are: 1. The maſculine apricot, that is the ſooneſt ripe of all, and has a ſmall roundiſh fruit, of a red colour towards the ſun, which as it ripens fades to a greeniſh yellow on the other ſide. It is only valuable for being ſooneſt ripe; for it has little flavour. 2. The Orange apricot, which is the next that becomes ripe, and is of a deep yellow colour. The fleſh is dry, and is better for tarts than for eating. 3. The Algier apricot ripens next, and is of an oval ſhape, only a little compreſſed on the ſides. It turns to a pale yellow or ſtraw-colour, when the fleſh is dry, with a faintiſh taſte. 4. The Roman is next, and is larger than the Algier, but not compreſſed on the ſides; the colour is deeper, and the fleſh is moiſter. 5. The Turky apricot is the next in order, becauſe it ripens later than the former, and is bigger than any of them, and has a globular ſhape. It is of a deeper colour, has a firmer fleſh, and a better taſte. 6. The Breda apricot was brought originally from Africa, and is a large roundiſh fruit, turning to a deep yellow when ripe, and is of a deep orange colour on the inſide. The fleſh is ſoft, full of juice, and better taſted than any of the whole tribe. 7. The Bruſſels apricot is the lateſt, it not being ripe till near the middle of Auguſt, unleſs expoſed to a ſouth ſun; however, too much heat ſpoils the taſte. It is red on the ſide next the ſun, with many dark ſpots, and of a greeniſh yellow on the other ſide; the fleſh is firm and of a high flavour, but it often cracks before it is ripe.

Moſt people train theſe trees up to ſtems of ſix or ſeven feet high, or breed them upon ſtocks of that height; but this is a bad practice, becauſe the higher the heads of theſe trees are, the more they are expoſed to the cutting winds in the ſpring, which too frequently deſtroy the bloſſoms; and the fruit is alſo more liable to be blown down in ſummer, eſpecially if there ſhould happen to be much wind at the time they are ripe; which by falling from a great height, will be bruiſed and ſpoiled. Half ſtandards of about two feet and a half, or three feet in the ſtem, will better anſwer the intention; or they may be placed as dwarfs againſt an eſpalier, where, if they are ſkilfully managed, they will produce a large quantity of good fruit; and the trees in eſpalier may be more conveniently covered in ſpring, when the ſeaſon proves bad; whereby there will be a certainty of fruit every year.

Theſe fruits are all propagated by breeding them on plum-ſtocks, and will readily take upon almoſt any ſort of plum, except the Bruſſels, provided the ſtock be free and thriving.

Moſt of theſe trees are planted againſt walls, and ſhould have an eaſt or weſt aſpect; for if they are planted full ſouth, the great heat renders them mealy before they are well eatable. The borders under theſe walls ſhould be ſix feet wide at leaſt, and the earth about two feet, or two feet and a half deep.

If your ground be a wet cold loam or clay, you ſhould raiſe your borders as much above the level of the ſurface as it will admit, laying ſome ſtones or rubbiſh in the bottom, to preſerve the roots from running downwards; but if you plant upon a chalk or gravel, you muſt remove it to a conſiderable width to make room for a good ſoil to be put in its place; tho' you need not go above two feet and a half deep at moſt.

The beſt ſoil for theſe and all other ſort of fruit-trees is freſh untried earth from a paſture ground, taken about ten inches deep with the turf, and laid to rot and mellow at leaſt twelve months before it is uſed; and this muſt be kept often turned to ſweeten and imbibe the nitrous particles of the air.

When the former ſoil of the border is taken away, this freſh earth ſhould ſupply its place; and if the borders are filled with it two months before the trees are planted, the ground will be better ſettled, and not ſo liable to ſink after the trees are planted. In filling the borders the ground ſhould be raiſed four or five inches above the level they are deſigned to allow for the ſettling.

Your borders being thus prepared, make choice of ſuch trees as are but one year's growth from budding; and if your ſoil be dry, or of a middling temper, you ſhould prefer October as the beſt ſeaſon for planting; but do not cut off any of the head at that time, unleſs there be any ſtrong fore-right ſhoots which will not come to the wall, and muſt therefore be taken away.

Your trees being thus prepared, mark out the diſtances they are to ſtand, which, in a good ſtrong ſoil, or againſt a low wall, ſhould be twenty feet or more; but if the wall be moderately high, eighteen feet is a reaſonable diſtance. Make a hole where each tree is to ſtand, and place the ſtem about four inches from the wall, inclining thereto: and after having fixed the tree in the ground, nail the branches to the wall, to prevent their ſhaking, and cover the ſurface of the ground round the roots with rotten dung to keep out the froſt. In this ſtate let it remain till February, when, if the weather be good, you muſt unnail the branches of your trees, taking care not to diſturb the roots; and being provided with a ſharp knife, put your foot cloſe to the ſtem of the tree, and having placed your left hand to the bottom of the tree, to prevent its being diſturbed, with your right hand cut off the head of the tree, to about four or five eyes above the bud, ſo that the ſloping ſide may be towards the wall.

In the ſpring, if the weather proves dry, you muſt now and then give your trees a gentle refreſhing with water; in the doing of which, if you obſerve to water them with a roſe to the watering-pot, all over their heads, it will greatly help them; and alſo lay ſome turf or other mulch about the roots, to prevent their drying during the ſummer ſeaſon. As new branches are produced, obſerve to nail them to the wall in a horizontal poſition; and diſplace ſuch ſhoots as grow in a fore-right direction. This muſt be repeated as often as neceſſary, to prevent their hanging from the wall; but by no means ſtop any of their ſhoots in ſummer.

At Michaelmas, when the trees have done growing, you muſt unnail the branches, and ſhorten them in proportion to their ſtrength; a vigorous branch may be left eight or nine inches long, but a weak one not above five or ſix: by this means no part of the wall will be left uncovered with bearing wood, which muſt be the caſe if the branches are left to a great length at firſt; for it ſeldom happens that more buds than two or three ſhoot for branches; and theſe are, for the moſt part, ſuch as are at the extreme part of the laſt year's wood: ſo that all the lower part of the ſhoots become naked, nor will they ever after produce ſhoots; and this is the reaſon we ſee ſo many trees which have their bearing-wood ſituated only in the extreme part of the tree.

When you have ſhortened the ſhoots, be ſure to nail them as horizontally as poſſible; for upon this precaution the future good of the tree depends.

The ſecond ſummer obſerve, as in the firſt, to diſplace all fore-right ſhoots as they are produced, nailing in the other cloſe to the wall horizontally, ſo that the middle of the tree may be kept open; and never ſhorten any of the ſhoots in ſummer, unleſs to furniſh branches to fill vacant places on the wall; and never do this later than April. At Michaelmas ſhorten theſe ſhoots, as was directed for the firſt year; the ſtrong ones may be left nine inches, and the weak ſix or ſeven at moſt.

The following year's management will be nearly the ſame with this; but only obſerve, that apricots produce their bloſſom-buds, not only upon the laſt year's wood, but alſo upon the curſons, or ſpurs, which are produced from two years wood: great care ſhould therefore be taken in the ſummer-management, not to hurt or diſplace theſe. Obſerve alſo to ſhorten your branches at the winter-pruning, ſo as to furniſh freſh wood in every part of the tree; and be ſure to cut out entirely all the luxuriant branches, or diſplace them as ſoon as they are produced; becauſe if they were left to grow, they would exhauſt the nouriſhment from the bearing branches, which cannot be too ſtrong, provided they are kindly; for the more vigorous your tree is, the more likely it will be to reſiſt the injuries of the weather: and trees are often brought to ſo weak a condition, as to produce only faint bloſſoms, and then moſt or all of the bearing branches will die. This misfortune, which is entirely owing to miſmanagement, is generally conſidered as the effect of a blight; and perhaps moſt of the blights we complain of proceed from the ſame cauſe.

Theſe few rules well executed, together with a little obſervation and care, will be ſufficient; for without diligent obſervation, there can be no ſuch thing as a ſkilful manager, be his inſtructions what they will.

The Bruſſels and Breda apricots, being for the moſt part planted for ſtandards, will require very little pruning or management; only obſerve to take out all dead wood, or ſuch branches as croſs each other: this muſt be done early in autumn, or in the ſpring after the cold weather is paſt, that the part where the inciſion is made may not canker. *Miller's Gardener's Dictionary.*

APRIL, in chronology, the fourth month of the year, containing thirty days.

The word is formed from the Latin *Aprilis*, which is derived from *aperio*, to open, becauſe the buds begin to open during this month.

A-PRIORI *demonſtration*. See DEMONSTRATION.

APRON, in gunnery, the piece of lead which covers the touch-hole of a piece of ordnance.

APSIS, in aſtronomy, a term uſed indifferently of either of the two points of a planet's orbit, where it is at greateſt or leaſt diſtance from the ſun or earth; and hence the line connecting thoſe points is called the line of the apſides.

The word is Greek, and derived from απτω, to connect. The apſis at the greateſt diſtance from the ſun is called the aphelion, and at the greateſt diſtance from the earth the apogee; while that at the leaſt diſtance from the ſun is termed the perihelion, and at the leaſt diſtance from the earth, the perigee. See APHELION, APOGEE, &c.

APSIS, among eccleſiaſtical writers, implies the inner part of the ancient churches, anſwering to what is at preſent called the choir.

APSIS is alſo uſed by ſome writers for the biſhop's ſeat or throne.

APTHANES. See ABTHANES.

APTOTE, in grammar, ſignifies an indeclinable noun, or one which has no variation of caſes.

The word is Greek, and compounded of α, priv. and πτωσις, a caſe.

APUS, or the bird of Paradiſe, in aſtronomy, a conſtellation in the ſouthern hemiſphere, not viſible in our latitude. It is near the ſouthern pole, between the triangulum auſtrale, and the chameleon; and conſiſts of eleven ſtars.

In the year 1677, Dr. Halley obſerved the longitude and latitude of the ſtars in Apus, which Hevelius, in his Prodromus, reduced, with ſome alteration, to the year 1700.

APYREXY, among phyſicians, implies the intermiſſion of a fever.

The word is Greek, απυρεξια, compounded of α, priv. and πυρ, fire, or heat.

AQUA, water. See the article WATER.

AQUA-FORTIS, a corroſive liquor diſtilled from nitre and vitriol, in the following manner.

Put vitriol into an earthen or iron pot; if you make a fire under it, the vitriol begins to melt and ſmoak; by increaſing the fire gradually, it thickens and aſſumes an aſh-colour. Let it be ſtirred with a twig before it becomes ſolid, till it be perfectly dry; but let it be taken as yet boiling out of the pot; for if it grows cold therein, it will ſtick ſo faſt that you will hardly be able to get it out. Pound to a ſubtile powder three pounds weight of this calcined vitriol, and mix them well with four pounds of nitre well dried, and pulverized very fine. Put theſe together in a cucurbit, or retort, or an iron pot, and then put it in a furnace.

At firſt, let the fire be made not much greater than is neceſſary to boil water. When the recipient grows warm, continue the ſame degree of fire, till all the phlegm is expelled, which you will know from the diminution of the heat of the recipient: increaſe the fire gradually, till you ſee a few yellow vapours ariſe. Keep up the ſame fire for an hour or two, and make it ſo ſtrong as to warm the veſſels moderately. Continue this for ſome hours, and letting the veſſels cool, pour the liquor, now emitting reddiſh fumes, out of the recipient into a glaſs veſſel, having a glaſs ſtopple: this liquor thus prepared is your aqua-fortis.

For ſecurity's ſake, you muſt leave, in the cloſure of the recipient and veſſel that contains the matter to be diſtilled, a hole, which may be ſtopped and opened with a wooden peg; for if you happen to exceed the juſt degree of fire, eſpecially in the beginning of the operation, the firſt and more ſubtile ſpirits, which are very elaſtic, come forth; the opening therefore of the hole may give them a paſſage, leſt the veſſels ſhould burſt, which would be very dangerous.

There are many other ingredients uſed in the making of aqua-fortis, ſuch as burnt alum, ſand, and the like; the reaſon whereof is to hinder the ſpecies, which may happen not to be ſufficiently calcined, from fuming, and breaking the veſſel with great violence. But when theſe ſpecies are duly calcined and dried, theſe additions are quite needleſs; and, indeed, by overſwelling the maſs to be diſtilled, require veſſels of a ſize proportionable.

There are many other needleſs and noxious ingredients uſed by ſome in making aqua-fortis. Theſe are blood-ſtones, unſlaked lime, plume alum, &c. all which ſhould be avoided, they making a much worſe, as well as a more expenſive aqua-fortis. A menſtruum thus made, therefore, ſhould never be uſed in docimaſtical operations before it has been accurately tried; for aqua-fortis being tainted with theſe heterogeneous matters, the major part of it conſumes away, and becomes frequently ſo fixed, that the ſtrongeſt fire is hardly able to take off any of it. Nothing ſhould be uſed beſides calcined vitriol, intimately mixed with nitre, there being no need of any thing elſe.

However, bole, clay, and brick-duſt, 'expel aqua-fortis out of nitre, which then is called the ſpiritus nitri; but you muſt add four times as much of theſe, in proportion to the nitre: conſequently this method, requiring larger veſſels and more fire, cannot be ſo profitable as without theſe ingredients.

As the extracted ſpirits of nitre are with difficulty condenſated into drops, eſpecially in ſultry weather, it will be proper, by reaſon of the calcined ingredients, to pour into the recipient one quarter part of pure water, or rather of the phlegm, extracted out of the aqua-fortis; by which means the ſpirits will be much eaſier received.

Aqua-marina, in natural hiſtory, the name of a precious ſtone of a colour compounded of green and blue, nearly reſembling that of ſea-water, from whence the name.

It ſeems very probable that the ancients knew it under the name of the beryl-ſtone; for Pliny obſerved that the moſt beautiful beryls were thoſe that imitated the colour of ſea-water; he likewiſe diſtinguiſhes ſeveral ſorts of beryls, which bear no reſemblance with our aqua-marina; as the chryſoberyls, which were of a golden colour. Whatever the ancients called the aqua-marina, we are now to endeavour to find out a ſure means to diſtinguiſh this precious ſtone from all others. The colour being a mixture of green and blue, we cannot confound it either with green or blue ſtones, as the emeralds and the ſaphires: for if we ſuppoſe the emerald of a pure green, without any tincture of blue, and the ſaphire blue as indigo, and free from any tincture of green, we may eaſily diſcover that all ſtones compounded of green and blue, can neither be emeralds nor ſaphires. This mixture of an emerald-colour with that of a ſaphire, that is, of green and blue, deſcribes ſo well the aqua-marina, that it ſeems impoſſible to be miſtaken: not but that there are ſome of theſe ſtones, where the green is more predominant than the blue; as well as others, where the blue is more powerful than the green. Theſe ſtones are very different from each other, with reſpect to their hardneſs. The oriental are reckoned the hardeſt, and bear the fineſt poliſh, and conſequently are more beautiful, more ſcarce, and dearer than the occidental.

The moſt beautiful aqua-marinas come from the Eaſt-Indies; and it is ſaid that ſome of them are found on the borders of the Euphrates and at the foot of Mount Taurus. The occidental ones come from Bohemia, Germany, Sicily, the Iſle of Elba, &c. And it has been affirmed that ſome of them have been found on the ſea-ſhore.

Aqua-regia, a corroſive menſtruum that has the power of diſſolving gold.—It is made in the following manner.

Take one pound of common ſalt; melt it in a clean crucible or iron ladle; pour it out into an iron mortar, and when cold break it into ſmall pieces. Put theſe into a retort, and pour upon them twice their weight of good aqua-fortis. Place the retort in a ſand furnace; lute on a receiver, and apply a gradual fire, till no more liquor drops from the noſe of the retort.—An aqua-regia may alſo be made, by mixing one part of ſpirit of ſalt with three of aqua-fortis; or by diſſolving the ſame quantity of ſal armoniac in it: but this ſhould be done ſlowly, and by degrees, otherwiſe great quantities of offenſive fumes will ariſe.

This menſtruum diſſolves iron, copper, tin, gold, mercury, regulus of antimony, biſmuth, and zinc; but not ſilver, unleſs it be deficient in ſtrength.

AQUÆDUCT, in architecture and hydraulics, a canal ſupported by ſtone, timber, &c. for conveying water from one place to another.

The word is Latin, *aquæductus*, q. d. *ductus aquæ*, a conduit of water.

The Romans, and ſeveral oriental nations, were very magnificent in their aquæducts, ſome of which extended an hundred miles. Frontinus, a man of conſular dignity, and who had the direction of the aquæducts under the emperor Nerva, mentions nine of theſe ſtructures that emptied themſelves through 13,594 pipes of an inch diameter. And Vigenere has obſerved that Rome received, every twenty-four hours, no leſs than 500,000 hogſheads of water.

Aquæduct, in anatomy, a term applied by anatomiſts to certain canals, on account of their form or uſe: ſuch are the aquæduct of Fallopium, a canal ſituated between the apophyſes, ſtyloides, and maſtoides; the aquæduct of Nuck, in the ſclerotic coat of the eye; and the aquæduct of Sylvius, in the brain; the poſterior ſurface of which is called its anus.

AQUARIANS, in eccleſiaſtical hiſtory, a ſect of Chriſtians in the primitive church, who conſecrated water in the Euchariſt, inſtead of wine, under pretence of abſtinence and temperance; or becauſe they thought it univerſally unlawful to eat fleſh, or drink wine.

Epiphanius calls them Eucratites, from their abſtinence; St. Auguſtine, Aquarians, from their uſe of water; and Theodoret, who ſays they ſprang from Tatian, Hydroparaſtatæ, becauſe they offered water inſtead of wine.

Beſides theſe, there was another ſort of Aquarians, who did not reject the uſe of wine as unlawful; for they adminiſtered the Euchariſt in wine at evening ſervice: but, in their morning aſſemblies, they uſed water, for fear the ſmell of wine ſhould diſcover them to the heathens.

St. Cyprian, who gives a long account of theſe in one of his epiſtles, tells us, it was the cuſtom of the church to uſe water mixed with wine, becauſe the water repreſents the people, as the wine does the blood of Chriſt; and when both are mixed together in the cup, then Chriſt and his people are united. The council of Carthage confirmed this practice: and Gennadius aſſigns two reaſons for it; firſt, becauſe it is according to the example of Chriſt; and ſecondly, becauſe, when our Saviour's ſide was pierced with the ſpear, there came out water and blood. The author of the Commentaries on St. Mark under the name of St. Jerom, gives another reaſon for mixing water with wine, namely, that by the one we may be purged from ſin; and by the other, redeemed from puniſhment. But there is no expreſs command for this; nor is it at all eſſential to the ſacrament.

AQUARIUS, in aſtronomy, a conſtellation which makes the eleventh ſign in the zodiac, marked thus, ♒. It conſiſts of forty-five ſtars in Ptolemy's catalogue, of forty in Tycho's, and in the Britannic catalogue of ninety-nine.

AQUATIC, in natural hiſtory, is an appellation given to ſuch things as live or grow in the water.

AQUEDUCT, the ſame with aquæduct. See Aquæduct.

AQUEOUS, ſomething abounding with water, or that partakes of its nature.

The word is formed from the Latin, *aquoſus*, which is derived from *aqua*, water.

Aqueous *Humour*, in anatomy, called alſo the albugineous humour, is the utmoſt of the three humours of the eye, and fills up both its cameræ. In this the uvea fluctuates as it were, and moves at liberty; this humour alſo, when loſt, will be repaired by nature.

AQUIFOLIUM, or Agrifolium, the holly tree, in botany, is an ever-green ſhrub very well known, and was formerly planted in gardens, as an ornament.

The wood is hard and ſolid, and is ſo heavy it will ſink in water. The flowers are ſmall, monopetalous, and divided into four ſegments, with as many ſtamina, and a flower-cup divided into four parts, from which a piſtil ariſes, fixed into the hinder part of the flower, like a nail; it changes to a ſoft fruit, or berry, which is round, imbricated, and red, and is full of whitiſh ſtones.

The manner of raiſing this ſhrub is by ſowing the berries as ſoon as they are ripe, where they will continue a year and a half before they ſpring. The beſt time of tranſplanting this tree is in the beginning of April, in moiſt weather, and then there will be little danger of their growing. It was formerly uſed as a medicine, but is now entirely laid aſide. Some uſe the bark for making bird-lime.

AQUILA, the eagle, in natural hiſtory. See the article Eagle.

Aquila, in aſtronomy, a conſtellation of the northern hemiſphere, conſiſting of fifteen ſtars in Ptolemy's catalogue, of ſeventeen in Tycho's, and of ſeventy in the Britannic catalogue.

Aquila *Marina*, the ſea eagle, the name of a fiſh of the paſtinacha kind, with a head reſembling in ſome meaſure that of a toad.

AQUILEGIA, *Columbine*, in botany, a plant with a branched and fibrous root, of a ſweetiſh taſte. It has leaves like meadow rue, cut on the edges, and bluiſh underneath, but above of a dark green. The flowers are pendulous, and conſiſt of many petals different from each other; from the middle of the flower ariſes the piſtil, beſet with ſtamina, which turns to a membraneous fruit, conſiſting of many huſks, or pods, each of which is full of black ſhining ſeeds. The colours of the flowers are various, as blue, red, white, fleſh-coloured, and green, upon which account it is cultivated in gardens, and they flower in May and June. For raiſing them, the ſeeds ſhould be ſown in a nurſery-bed in September, and in March following the young plants will appear above ground, which ſhould be tranſplanted in the middle of May into good freſh earth, and ſet at nine inches diſtant every way. At Michaelmas they may be removed into the borders of a flower-garden, and the May following they will produce flowers. It has been looked upon as an aperient and ſudorific; but it is now out of uſe.

AQUILICIA, or Aquiliciana, in antiquity, ſacrifices performed by the ancient Romans, in times of exceſſive drought, to obtain rain from the gods.

AQUOSE, the ſame with aqueous. See Aqueous.

ARA, the altar, in aſtronomy, a conſtellation of the ſouthern hemiſphere, conſiſting of eight ſtars.

ARABESQUE, or Arabesk, ſomething done after the manner of the Arabians.

ARABIAN, ſomething that relates to Arabia, or the Arabs.

Arabian, or Arabic *Tongue*, is a branch or dialect of the Hebrew.

Father Angelo de St. Joſeph ſpeaks much of the beauty and copiouſneſs of the Arabic. He aſſures us it has no leſs than a thouſand names for a ſword; five hundred for a lion; two hundred for a ſerpent; and eighty for honey.

Arabian *Figures* or *Characters*, the numeral figures commonly uſed in arithmetical computations.

The origin of theſe characters has been a ſubject of diſpute in the republic of letters. The learned are generally of opinion that the Arabic figures were firſt taught us by the Saracens, who borrowed them from the Indians. Scaliger was ſo ſatisfied of their novelty, that he immediately pronounced a ſilver medallion he was conſulted about, modern, upon his ſeeing of the numeral figures 234, 235, on it. The common opinion is, that Planudes, who lived towards the cloſe of the thirteenth century, was the firſt Chriſtian who made uſe of them. Father Mabillon even aſſures us, in his work de Re Diplomatica, that he has not found them any where earlier than the fourteenth.

Yet Dr. Wallis inſiſts on their being of a much older ſtanding; and concludes they muſt have been uſed in England, at leaſt as long ago as the time of Hermannus Contractus, who lived about the year 1050; if not in ordinary affairs, yet at leaſt in mathematical ones, and particularly aſtronomical tables. *Vid Wall. Algeb.*

The ſame author gives us an inſtance of their antiquity in England, from a mantle-tree of a chimney in the parſonage houſe of Helendon in Northamptonſhire, wherein is the following inſcription in baſſo relievo, M°. 133, being the date of the year 1133. *Philoſ. Tranſact.* N°. 255.

Mr. Luffkin furniſhes a yet earlier inſtance of their uſe, in the window of a houſe, part of which is a Roman wall, near the market-place in Colcheſter; where between two carved lions ſtands an eſcutcheon, containing the figures 1090. *Philoſ. Tranſact.* N°. 255.

Mr. Huet is even of opinion, that theſe characters were not borrowed from the Arabs, but from the Greeks; and that they were originally no other than the Greek letters, which we all know that people made uſe of to expreſs their numbers by.

ARABIAN *Philoſophy*, the ſtate of philoſophy among the ancient Arabians.

Authors of great antiquity inform us, that the ancient Arabians applied themſelves very much to philoſophy, and diſtinguiſhed themſelves by a peculiar and ſuperior ſagacity: but all they ſay on this head ſeems very uncertain. Indeed, after Iſſamim, learning and the ſtudy of philoſophy were greatly eſteemed among this people; but this has no place in hiſtory till we come to the philoſophy of the middle age; and, conſequently, proves nothing with regard to the philoſophy of the ancient inhabitants of Arabia Felix.

Some men of letters have aſſerted, that the ancient Arabs applied themſelves to philoſophical ſpeculations; and to maintain their opinion, raiſe imaginary ſyſtems which they attribute to them, and draw in the religion of the Sabeans to their aid, which they pretend to have been the offspring of philoſophy. But all they advance in favour of this opinion is founded on aſſertions and conjectures; and what are thoſe where proof and teſtimony are wanting? They are even forced to acknowledge that the Greeks were of another opinion, looking on them as a moſt barbarous and ignorant people, without the leaſt tincture of learning. If credit may be given to Abulfaragius, the Arabian writers themſelves confeſs, that before Iſſamim they were ſunk into the deepeſt ignorance.

Theſe reaſons, however, do not ſeem ſtrong enough to thoſe on the other ſide of the queſtion, to induce them to retract their opinion of the philoſophy they attribute to the ancient Arabs. The contempt the Greeks expreſs for this nation, ſay they, proves only the pride of the Greeks, not the barbariſm of the Arabians. But what authority can they produce, or what writers can they quote, in favour of their opinion concerning the philoſophy of the ancient Arabians? They agree with Abulfaragius, that there are none; this opinion therefore ſtands on a very weak foundation.

Joſeph Peter Ludewig has ſignalized himſelf moſt in this diſpute, and ſeems to have had the honour of the ancient Arabians very much at heart. He ſets out in this manner: "Pythagoras, ſays he, as Porphyry relates, in his travels to improve his learning, did the Arabians the honour of a viſit; ſtaid ſome time among them, and learned, of their philoſophers, divination by the chirping and flight of birds; an art in which they excelled.

Moſes himſelf, inſtructed in all the learning of the Egyptians, choſe Arabia for a retreat in his exile, preferable to other countries. Can one imagine the great legiſlator of the Hebrews would have choſe this retreat if the people had been barbarous, ſtupid, and ignorant? Beſides, their origin leaves no room to doubt of the improvement of their mind: they boaſt of their lineage from Abraham, whom no one can deny to have been a great philoſopher. By what ſtrange accident is that ſpark of philoſophic ſpirit extinguiſhed, which they inherited from their common father Abraham? But what yet appears a ſtronger argument is this, that the ſacred writings, to give a more exalted idea of Solomon's wiſdom, place it in oppoſition to the wiſdom of the wiſe men of the Eaſt, which is certainly Arabia. From Arabia alſo came the queen of Sheba to admire the wiſdom of the philoſopher, inveſted with a diadem; this has been the conſtant opinion of all men of erudition. It is eaſy to prove that the Magi, who came out of the Eaſt to worſhip our Saviour, were Arabians. In ſhort, Abulfaragius is obliged to agree, that before the time of Iſſamim, to whom the revival of learning in that country is owing, they were perfect maſters of their own language, good poets, excellent orators, and able aſtronomers. Is not this enough to give them a right to the title of philoſophers?"

No, it may be replied, the Arabians might have poliſhed their language, have ſucceeded in compoſition, have been ſkilful in the ſolution of riddles, and interpretation of dreams; nay, though it be admitted they had ſome knowledge of the courſes of the ſtars, it will not follow they were philoſophers; for all thoſe arts, if they merit the name, tend more to increaſe and encourage ſuperſtition, than to diſcover truth, or diveſt the ſoul of the paſſions which enſlave it. As to what concerns Pythagoras, nothing is more uncertain, than whether he travelled into the Eaſt or no; but, admitting he did, what are we to conclude, but that he learned from the Arabians all thoſe ſuperſtitious and extravagant notions he was ſo extremely fond of. It is needleſs to quote Moſes here; if this great man went into that country, and ſettled there, by marrying one of Jethro's daughters, it certainly was not with a deſign of ſtudying and encouraging them in their fooliſh curioſity in philoſophical ſyſtems. Providence permitted this retreat of Moſes among the Arabians, to carry among them the knowledge of the true God, and his religion. The philoſophy of Abraham, from whom they boaſt their deſcent, by no means proves their having cultivated this ſcience. Abraham might have been their primogenitor, and a great philoſopher; but their philoſophy is no neceſſary conſequence of this. If they loſt the thread of thoſe moſt valuable truths they had learned from Abraham; if their religion degenerated into groſs idolatry; why might not their philoſophy, admitting Abraham to have taught it them, have been loſt alſo in courſe of time? Beſides, it is not certain that theſe people deſcended from Abraham. This is a traditionary tale, that ſeems to have taken birth with Mahometaniſm. The Arabians, like the Mahometans, to give the ſanction of authority to their errors, have pretended to deduce their origin from the father of the faithful. Another thing that overturns Ludewig's hypotheſis, is, that Abraham's philoſophy is a mere device of the Jews, who would fain perſuade us that the origin of all arts and ſciences is to be found among them. What they ſay in ſupport of the queen of Sheba's coming to viſit Solomon on the fame of his wiſdom, or of the wiſe men who came out of the Eaſt to Jeruſalem, will prove nothing more than has been advanced before. Let it be granted that this queen was born in Arabia; is it proved ſhe was of the ſect of the Sabians? No one will pretend to deny her to have been the moſt expert and ſagacious woman of her time; and that ſhe frequently puzzled all the kings of the Eaſt with her wiſe queſtions; becauſe the ſacred writings have given this account of her. But what has this to do with the philoſophy of the Arabians? We acknowledge very freely, that the Magi who came out of the Eaſt were Arabians; that they were not without ſome knowledge of the courſes of the ſtars: we do not abſolutely exclude the Arabians from this ſcience, but admit they ſpoke their native language well; ſucceeded in ſome works of invention, as oratory, poetry; but we are not to infer from hence that they were philoſophers, and had applied themſelves ſtrongly to the cultivation of this part of literature.

A ſecond argument in favour of the philoſophy of the ancient Arabians, and which is urged as a very forcible argument too, is the hiſtory of Sabianiſm, which neceſſarily implies philoſophical knowledge, ſuppoſing all to be true which is ſaid about it. We cannot conclude any thing from thence in favour of this opinion: for Sabianiſm is in itſelf a mixture of ſhameful idolatry and ridiculous ſuperſtition; much more likely to ſubvert and extinguiſh reaſon, than propagate true philoſophy; beſides, it is not agreed in what age this ſect firſt appeared. Men of the greateſt eminence for learning, who have laboured to give light to this paſſage in hiſtory, as Hottinger, Hyde, Pocock, and eſpecially the learned Spencer, confeſs that there is no mention made of this ſect, either by the Greeks or Romans.

We muſt take care not to confound theſe Sabians of Arabia with thoſe mentioned in the annals of the ancient eaſtern church, which were half Jews, half Chriſtians; and boaſted of being the diſciples of St. John the Baptiſt; great numbers of whom, even to this day, inhabit the city of Baſſora, near the banks of the Tigris, and the neighbourhood of the Perſian ſea. The famous Moſes Maimonides has extracted a large account of this ſect from the Arabic writers, and by examining their extravagant and ſuperſtitious ceremonies with attention, has very ingeniouſly juſtified the laws of Moſes in general; which at firſt might give offence to delicacy, if the wiſdom of theſe laws was not ſhewn by their oppoſition to the laws of the Sabians. A ſtronger barrier could not be put between the Jews and Arabians, who were their neighbours.

The Arabian philoſophy was entirely Sabian, and included the ſyſtem and ceremonies of that ſect of idolators. This was what Mahomet laboured ſo ſtrenuouſly to aboliſh; and he is even ſaid by ſome to have carried his oppoſition ſo far as to prohibit the very ſtudy of philoſophy. But his followers by degrees got over that reſtraint; the love of learning increaſed, and the philoſophy of Ariſtotle was eſtabliſhed among them, during the memorable caliphate of Al-Mamon. Avicenna flouriſhed in the eleventh century, and Averrhoes an hundred years after him; ſo that the honour of tranſlating the Greek philoſophy into Arabic, cannot belong to them, notwithſtanding what has been ſaid on that ſubject; though they were doubtleſs the chief propagators of it through the countries of Europe.

Their method of philoſophizing was faulty; they followed Ariſtotle implicitly, and run into all the ſtrange ſuperſtitions of aſtrology. They founded ſchools and academies, became fond of ſubtilties and diſputation, and ſoon divided into different ſects.

As they choſe Ariſtotle for their maſter, ſo they chiefly applied themſelves to that part of philoſophy called logic; and thus became proficients in the knowledge of words, rather than of things: whence they have been called the talking philoſophers, and maſters of the wiſdom of words. Their philoſophy was obſcured by quaint arbitrary terms and notions, and on theſe, inſtead of evident principles, their demonſtrations were founded.

ARABIAN *Poetry*, in the moſt ancient times, was no other than rhiming; for it was deſtitute both of meaſure and cadence. But about the cloſe of the eighth century, and during the caliphate of Al-Rachid, it became an art, and was regulated by laws of proſody. It however ſtill makes no diſtinction between long and ſhort ſyllables, the whole depending on rhime, a certain number of letters, and the obſervation of certain cenſuræ, formed by carefully diſtinguiſhing the moveable from the quieſcent conſonants. A ſyllable to which a quieſcent letter is added at the end, becomes long by poſition; and, on the contrary, that ſyllable ſhort where it is wanting.

Renaudot tells us, that the Arabian compoſitions in verſe are ſtill wild and irregular, being neither epic, dramatic, nor lyric: in ſhort, not reducible to any particular kind. Their hymns to the deity, and their tales, are in the ſame ſtyle. Their compariſons, in which they abound, are taken, with very little choice, from tents, camels, hunting, and the ancient manners of the Arabs.

ARABIAN *Phyſic*, and *Phyſicians*, ſucceeded the Grecian, and handed down the art to us, with conſiderable improvements, chiefly in the pharmaceutical and chemical parts.

ARABICI, in eccleſiaſtical hiſtory, the name of a ſect of heretics that appeared in Arabia during the reign of the emperor Severus, about the year 207. Their hereſy conſiſted in holding that the ſoul both dies and riſes again with the body. Origen confuted them ſo fully, that they ingenuouſly acknowledged their error.

Gum ARABIC. See GUM *Arabic*.

ARABISM, an idiom or manner of ſpeaking peculiar to the Arabs, or Arabic language.

ARABLE *Land*, in huſbandry, that which is fit for tillage, or has actually been plowed.

The word is derived from the Latin, *aratrum*, a plow.

ARAC, or ARRAC, a ſpirituous liquor imported from the Eaſt-Indies.

It is extracted from a vegetable juice called toddy, which flows by inciſion from the cocoa-nut tree. This juice, after being fermented, is diſtilled in the common manner, and the produce is the arac.

ARACHNOIDES, in anatomy, is an appellation given to ſeveral different membranes, as the tunic of the cryſtalline humour of the eye, the external lamina of the pia mater, and one of the membranes of the ſpinal marrow.

The word is Greek, and compounded of *αραχνη*, a ſpider, or ſpider's web, and *ειδος*, reſemblance; the fineneſs of theſe membranes being ſuppoſed to reſemble that of the ſpider's web.

ARÆOMETER, or WATER-POISE, an inſtrument for meaſuring the denſity or gravity of fluids.

The word is formed from the Greek, *αραιως*, thin, and *μετρεω*, to meaſure.

This inſtrument is generally made of a thin glaſs ball with a taper neck, hermetically ſealed at the top, having firſt as much mercury poured into the ball, as will keep it ſwimming in an erect poſition. The neck is divided into equal parts, and properly numbered; ſo that the lightneſs of the fluid is known by the depth the aræometer ſinks in it; it being evident that the heavier any fluid is, the leſs will be the diſtance the inſtrument will ſink in it; and vice verſa.

ARÆOPAGUS. See AREOPAGUS.

ARÆOSTYLE, in architecture, a term uſed by Vitruvius to ſignify the greateſt interval that can be made between columns, and which conſiſts of eight modules, or four diameters. See MODULE.

ARÆOTICS, in medicine, remedies which rarify the humours, and render them proper for being carried off by perſpiration through the pores of the ſkin.

The word is formed from the Greek, *αραιωτικος*, which is derived from *αραιοω*, to rarify.

ARAIGNEE, in the military art, ſignifies the branch, return, or gallery of a mine. See the article MINE.

ARANEA TUNICA, or ARANEOSA, in anatomy; ſee the article ARACHNOIDES.

ARANEA CONCHA, the ſpider-ſhell, in natural hiſtory, a name given to ſeveral ſpecies of the murex. See MUREX.

ARBALET, in antiquity, a kind of weapon, generally called at preſent a croſs-bow. See the article CROSS-BOW.

The ancients had alſo large machines of the ſame kind for throwing ſeveral arrows at a time. Theſe were generally called baliſtæ. See BALISTA.

ARBITER, in the civil law, implies a judge nominated by the magiſtrate, or choſen voluntarily by the two contending parties, in order to decide their differences according to law.

The civilians make a difference between arbiter and arbitrator, though both found their power on the compromiſe of the parties; the former being obliged to judge according to the cuſtoms of the law, whereas the latter is at liberty to uſe his own diſcretion, and accommodate the difference in the manner that appears to him moſt juſt and equitable.

ARBITRARY, whatever is left to the choice or determination of men, or not fixed by any poſitive law or injunction. Thus arbitrary fines are mulcts impoſed at the pleaſure of the court or judge.

ARBITRARY *Power*. See DESPOTISM.

ARBITRATION, ARBITRAGE, or ARBITRAMENT, a power given by two or more contending parties to ſome perſon or perſons to determine the diſpute between them.

ARBITRATOR, a private extraordinary judge, choſen by the mutual conſent of both parties, to determine controverſies between them.

ARBOR, the Latin appellation for any tree in general.

ARBOR *Dianæ*. See DIANÆ *Arbor*.

ARBOR, in mechanics, implies the principal part of a machine which ſerves to ſuſtain the reſt; alſo the axis or ſpindle on which a machine turns.

ARBORESCENT, an epithet applied to ſuch objects as reſemble trees.

ARBORIST, a perſon ſkilled in that part of botany which treats of trees.

ARBOUR, in gardening, a kind of ſhady bower, formerly in great eſteem, but of late rejected, on account of its being damp and unwholeſome.

Arbours are generally made of lattice work, either in wood or iron, and covered with elms, limes, hornbeams; or with creepers, as honeyſuckles, jeſſamines, or paſſion-flowers; either of which will anſwer the purpoſe exceeding well, if properly managed.

ARBUTUS, the ſtrawberry-tree, in botany, a genus of ever-green trees, whoſe leaves are oblong, and ſerrated on the edges: the flower conſiſts of one leaf, and are ſhaped like a pitcher; the fruit is of a fleſhy ſubſtance, and, in its outward appearance, very like a ſtrawberry; but is divided into five cells, in which are contained many ſmall ſeeds.

There are three ſpecies of this tree; 1. The common ſtrawberry-tree. 2. The ſtrawberry-tree with longer flowers, and egg-ſhaped fruit; and 3. The ſtrawberry-tree with double flowers.

This tree has its name from the reſemblance the fruit bears to that of a ſtrawberry, but is of an auſtere ſour taſte; though I have been informed that, in Ireland, where this tree abounds, the fruit is ſold and eaten. In England they are chiefly brought to the markets with ſmall branches of the tree, having ſmall bunches of flowers upon them, and made up into noſegays, with other flowers, and ſome ſprigs of the amomum plinii, or winter cherry; which at that ſeaſon is very acceptable, when there are few flowers to be had.

The time of this fruit being ripe is in the months of October and November; at which ſeaſon the flowers are blown for the next year's fruit; ſo that from the time of flowering to the ripening of the fruit is one whole year.

The beſt method of propagating theſe trees is by ſowing their ſeeds, which ſhould be preſerved in dry ſand till March; at which time you ſhould ſow them upon a very moderate hot bed, (which greatly promotes their vegetation) covering it about a quarter of an inch with light earth, and ſcreening it from froſts, or great rains. Towards the latter end of April your young plants will appear; you muſt therefore keep them clear from weeds, and give them frequent waterings, as the ſeaſon may require, and ſhade them in hot weather; and if your plants have done well, they will be, by autumn, about five or ſix inches high: but as theſe trees are ſubject to receive damage from froſts, eſpecially while they are young, you muſt hoop the bed over, that, when bad weather comes, you may cover it with mats and ſtraw to keep out the froſt.

The beginning of April following you may tranſplant theſe trees, each into a ſmall pot; but, in doing of this, be very careful to take them up with as much earth to their roots as poſſible; for they are bad rooting plants, and very ſubject to miſcarry on being removed; and it is for this reaſon I adviſe their being put into ſmall pots: for when they have filled the pot with roots, they may be turned out into large pots, or the open ground, without any hazard of their dying.

When you have put your young plants into the ſmall pots, you ſhould plunge them into another very moderate hot-bed, to encourage their taking new root, ſhading them from the ſun in the middle of the day, and giving them water as they may require: in this bed it will be proper to let the pots remain moſt part of the ſummer; for if the pots are taken out, and ſet upon the ground, the ſmallneſs of their ſize will occaſion the earth to dry ſo faſt, that watering will ſcarce preſerve your trees alive; but if they are kept growing all the ſummer, they will be near a foot high by the next autumn: but it will be adviſeable to ſcreen them from the froſt during their continuance in pots, by plunging them into the ground in a warm place, and covering them with mats in bad weather.

When your trees are grown to three or four feet high, you may ſhake them out of the pots into the open ground, where they are to remain: but this ſhould be done in April, that they may have taken good root before the winter, which would be apt to damage them if newly planted. *Miller's Dict.*

ARC, or ARCH. See the article ARCH.

The word is formed from the Latin, *arcus*, a bow.

ARCANUM, a ſecret, generally uſed to imply a remedy, whoſe compoſition is concealed, in order to increaſe its value.

ARCA CORDIS, in anatomy, the ſame with pericardium. See PERICARDIUM.

ARCADIANS, the name of a ſociety of men of letters, who formed themſelves into a body at Rome, in the year 1690, with a deſign to preſerve learning, and carry Italian poetry to perfection.

They took the name of Arcadians partly from the rules of their ſociety, and partly from every new member's aſſuming, on his admiſſion, the name of ſome ſhepherd of ancient Arcadia. Once in four years they elect a preſident, under the title of guardian, appointing him twelve fellows, who decide all affairs of the ſociety. The famous Chriſtina, queen of Sweden, was their firſt patroneſs. They reckon by Olympiads, and celebrate their feſtivals of wit every fourth year.

ARCBOUTANT, in building, an arched buttreſs. See BUTTRESS.

ARCH, in geometry, ſome part of a curve, intercepted between two points.

ARCH *of a Circle* is a part of its circumference.

Equal ARCHES are thoſe which contain the ſame number of degrees, and are cut from the ſame circle.

Similar ARCHES are thoſe which contain the ſame number of degrees, but cut from unequal circles.

Diurnal ARCH, in aſtronomy, is that part of a circle which is deſcribed by any heavenly object between its riſing and ſetting.

Nocturnal ARCH is that part of a circle deſcribed by a heavenly object between its ſetting and riſing. The diurnal and its ſucceeding nocturnal arch are together equal to a whole circle.

ARCH *of Progreſſion*, or *Direction*, is the arch of the zodiac, which a planet appears to paſs over when it moves in conſequentia, or according to the order of the ſigns.

ARCH *of Retrogradation* is an arch of the zodiac deſcribed by a planet, while it is retrograde, or its motion contrary to the order of the ſigns.

ARCH *of Viſion* is an arch of an azimuth circle, intercepted between the center of the ſun, after its ſetting, and the horizon, when a ſtar, before hid in his rays, begins to appear again.

ARCH, in architecture, implies a concave building, erected on a mould bent in the form of a curve, for ſupporting ſome ſtructure.

Arches are either circular, elliptical, or ſtraight, as they are improperly called by workmen.

Circular ARCHES are of three kinds, ſemicircular arches, ſcheme arches, and arches of the third and fourth point.

Semicircular ARCHES are thoſe that have their centers in the middle of the lines drawn from one foot to the other.

Scheme or *Skene* ARCHES are leſs than a ſemicircle, ſome containing ninety, and others only ſeventy degrees.

ARCHES *of the third and fourth Point*, conſiſt of two arches of a circle, meeting in an angle at the top, being drawn from the diviſion of a chord into three or four parts at pleaſure.

Elliptical ARCHES conſiſt of ſemi-ellipſes, and have commonly key-ſtones and impoſts. They are uſually deſcribed by workmen on three centers.

Straight ARCHES are thoſe uſed over doors and windows, having plain ſtraight edges, both above and below, parallel to each other; but both the ends and joints point towards a center.

For the theory of arches, ſee the article BRIDGE.

Triumphal ARCH, a ſtately gate of a ſemicircular form, adorned with ſculpture, inſcriptions, &c. erected in honour of thoſe who have deſerved a triumph.

Mural ARCH. See MURAL *Arch*.

ARCHÆUS. See ARCHEUS.

ARCH-ANGEL, in theology, an intellectual being, or angel of the ſecond order in the celeſtial hierarchy.

The word is compounded of the Greek, αρχος, chief, and αγγελος, an angel.

ARCHANGEL, in botany, a name ſometimes given to the lamium. See LAMIUM.

ARCH-BISHOP, a prelate, having ſeveral ſuffragan biſhops under him.

Though biſhops, in the primitive church, were all veſted with the ſame office and authority, yet, as Chriſtianity increaſed, it was found neceſſary to enlarge the epiſcopal power: therefore, as before there was commonly a biſhop placed in every great city, ſo now, in every metropolis, as the Romans called it, or mother-city, of every province, wherein were courts of civil judicature, there was a metropolitan, or archbiſhop, who had eccleſiaſtical juriſdiction over all the biſhops of that province. His juriſdiction conſiſted in ordaining, or ratifying, the elections and ordinations of all other biſhops; and once a year he was to ſummon them all to a ſynod, in which he preſided, to enquire into their conduct, to cenſure with ſuſpenſion, or deprivation, and to hear and determine cauſes between contending biſhops.

Dr. Bingham is of opinion, that archbiſhop was originally but another name for patriarch; though in proceſs of time their juriſdiction became diſtinct.

The firſt eſtabliſhment of archbiſhoprics in England, if we may credit Bede, one of the moſt ancient writers of the Engliſh nation, was, in the time of Lucius, ſaid to be the firſt Chriſtian king of England; who, after the converſion of his ſubjects, erected three archbiſhoprics, in London, York, and Landaff, then called Caerleon. The dignity of archbiſhop continued in the ſee of London 180 years, when it was tranſlated to Canterbury, where it has continued ever ſince. York remains a metropolitical ſee to this day. The archbiſhop of Canterbury is ſtiled "Primate, and Metropolitan of all England;" and the archbiſhop of York, "Primate, and Metropolitan of England."

ARCHBUTLER, one of the great officers of the German empire, who preſents the cup to the emperor on ſolemn occaſions. This office belongs to the king of Bohemia.

ARCHCHAMBERLAIN, an officer of the empire, nearly the ſame with the great chamberlain of England. The elector of Brandenburgh was appointed archchamberlain, by the golden bull.

ARCHCHANTOR, the preſident of the chantors of a cathedral or collegiate church.

ARCHDEACON, an eccleſiaſtical dignitary, or officer, next to a biſhop, whoſe office extends over part, or ſometimes the whole dioceſe.

There are ſixty archdeacons in England, who viſit the pariſhes ſubject to their juriſdiction, enquire into the repairs of churches, reform abuſes, ſuſpend, excommunicate, &c. They likewiſe, in many places, induct clerks into their benefices.

ARCH-DUKE, a title given to dukes of greater authority and power than other dukes.

ARCHE, among phyſicians, implies the beginning or firſt period of a diſeaſe.

The work is Greek, αρχη, and ſignifies beginning.

ARCHED *Legs*, in horſemanſhip, when the knees of a horſe are bended in the form of an arch. This is reckoned a very great fault, and is often occaſioned by hard travelling.

ARCHER, in the ancient military art, implied a perſon who fought with a bow and arrows.

ARCHES, or *Court of* ARCHES, the ſupreme court belonging to the archbiſhop of Canterbury, to which appeals lie from all the inferior courts within his province.

ARCHETYPE, the firſt or original model of a work, which is copied after to make another like it.

The word is compounded of the Greek, αρχη, beginning, and τυπος, a type.

This term is uſed by minters to ſignify the ſtandard weight by which the others are adjuſted.

ARCHEUS, among chemiſts, implies the predominating principle of things, whereby their peculiar qualities are fixed and determined. Others, however, mean by this term, a certain univerſal ſpirit diffuſed through the whole creation, and which is the active cauſe of all the phœnomena in nature. They even attribute ideas to the archeus, and thence call them archeal ideas.

ARCHIATOR, the chief or principal phyſician of a prince, who retains ſeveral of the faculty.

The word is Greek, αρχιατρος, and compounded of αρχη, chief, and ιατρος, a phyſician.

ARCHIL, *Archilla*, in botany, a whitiſh moſs growing upon rocks in the Canary and Cape Verd Iſlands, and which yields a rich purple tincture, fugitive indeed, but extremely beautiful.

This weed is imported to us as it is gathered: thoſe who prepare it for the uſe of the dyer, grind it betwixt ſtones, ſo as to thoroughly bruiſe, but not reduce it into powder, and then moiſten it occaſionally with a ſtrong ſpirit of urine, or urine itſelf mixed with quick-lime: in a few days it acquires a purpliſh red, and at length a blue colour: in the firſt ſtate it is called archil, in the latter lacmus, or litmaſe.

The dyers rarely employ this drug by itſelf, on account of its dearneſs and the periſhableneſs of its beauty. The chief uſe they make of it is, for giving a bloom to other colours, as pinks, &c. This is effected by paſſing the dyed cloth or ſilk through hot water, lightly impregnated with the archil. The bloom thus communicated ſoon decays upon expoſure to the air. Mr. Hellot informs us, that by the addition of a little ſolution of tin, this drug gives a durable dye; that its colour is at the ſame time changed towards a ſcarlet; and that it is the more permanent, in proportion as it recedes the more from its natural colour.

Prepared archil very readily gives out its colour to water, to volatile ſpirits, and to ſpirit of wine: it is the ſubſtance principally made uſe of for colouring the ſpirits of thermometers. As expoſure to the air deſtroys its colour upon cloth, the excluſion of the air produces a like effect in theſe hermetically ſealed tubes; the ſpirits of large thermometers becoming in the compaſs of a few years colourleſs. M. l'Abbè Nollet obſerves, (in the French Memoirs for the year 1742) that the colourleſs ſpirit, upon breaking the tube, ſoon reſumes its colour, and this for a number of times ſucceſſively; that a watery tincture of archil, included in the tubes of thermometers, loſt its colour in three days; and that in an open deep veſſel it became colourleſs at the bottom, whilſt the upper part retained its colour.

A ſolution of archil in water, applied on cold marble, ſtains it of a beautiful violet or purpliſh-blue colour, far more durable than the colour which it communicates to other bodies.

Mr. du Foy ſays he has ſeen pieces of marble ſtained with it, which in two years had ſuffered inſenſible change. It ſinks deep into the marble, ſometimes above an inch; and at the ſame time ſpreads upon the ſurface, unleſs the edges be bounded by wax, or other like ſubſtances. It ſeems to make the marble ſomewhat more brittle.

Linnæus informs us, in the Swediſh Tranſactions for the year 1742, that the true archil moſs is to be found on the weſtern coaſts of England; and ſuſpects, that there are ſeveral other more common moſſes, from which valuable colours might be extracted: a quantity of ſea-moſs having rotted in heaps upon the ſhore, he obſerved the liquor in the heaps to look like blood, the ſea-water, and the ſun, and the putrefraction, having brought out the colour. Mr. Kalm, in an appendix to Linnæus's paper in the year 1745, mentions two ſorts of moſſes actually employed in ſome parts of Sweden for dying woolen red: one is the *Lichenoides coralliforme apicibus coccineis*, of Ray's Synopſis; the other the *Lichenoides tartareum farinaceum, ſcutellarum umbone fuſco*, of Dillenius. This laſt is a white ſubſtance, like meal clotted together, found on the ſides and tops of hills. It is ſhaved off from the rocks after rain, purified from the ſtony matters intermixed among it by waſhing with water, then dried in the ſun, ground in mills, and again waſhed and dried: it is then put into a veſſel with urine, and ſet by for a month. A little of this tincture, added to boiling water, makes the dying liquor. In the ſame Tranſactions for the year 1754, there is an account of another moſs, which, prepared with urine, gives a beautiful and durable red or violet dye to wool and ſilk. This is the *Lichen foliaceus, umbilicatus, ſubtus lacunoſus linn. ſlor. Suec.* It grows upon rocks, and is readily diſtinguiſhed from others of that claſs, by its looking as if burnt or parched; conſiſting of leaves as thin as paper, convex all over on the upper ſide, with correſponding cavities underneath, adhering firmly to the ſtones by a little root under the leaves, and coming aſunder, when dry, as ſoon as touched. It is gathered after rain, as it then holds beſt together, and parts eaſieſt from the ſtone.

In France, a cruſtaceous moſs, growing upon rocks in Auvergne, is prepared with lime and urine, and employed by the dyers as a ſuccedaneum to the Canary archil, to which it is ſaid to be very little inferior: it is called orſeille d'Auvergne, or perelle. Mr. Hellot relates, that he has met with ſeveral other moſſes, which, on being prepared in the ſame manner, acquire the ſame colour. The moſt expeditious way, he ſays, of trying whether any moſs will yield an archil or not, is, to moiſten a little of it with a mixture of equal parts of ſpirit of ſal ammoniac and ſtrong lime water, and add a ſmall portion of crude ſal ammoniac; the glaſs is then to be tied over with a piece of bladder, and ſet by for three or four days. If the moſs is of the proper kind, the little liquor which runs from it upon inclining the veſſel, will appear of a deep crimſon colour; and this afterwards evaporating, the plant itſelf acquires the ſame colour. *Lewis's Notes on Neumann's Chemiſtry.*

ARCHILOCHIAN, a term in poetry, applied to a ſpecies of verſe invented by Archilochus.

Theſe verſes conſiſt of ſeven feet, the four firſt of which are ordinary dactyls, though ſometimes ſpondees, and the three laſt trochees. The following verſe from Horace is of this kind:

Solvitur acris hyems grata vice veris et Favoni.

ARCHIMANDRITE, in eccleſiaſtical hiſtory, was a name given by the ancient Chriſtians to what we now call an abbot. Father Simon obſerves, that the word *mandrite* is Syriac, and ſignifies a ſolitary, or monk.

ARCHIPELAGO, in geography, a general name for a ſea interrupted with a great number of iſlands.

The moſt celebrated Archipelago, and that to which the name is in ſome meaſure appropriated, lies in the ſea between the coaſts of Greece, Macedonia, and Aſia.

ARCHISYNAGOGUS, the chief of the ſynagogue; the title of an officer among the Jews, who preſided in their ſynagogues and aſſemblies.

The number of theſe officers was not fixed, nor the ſame in all places; there being ſeventy in ſome, and in others only one. They are ſometimes called princes of the ſynagogue, and had a power of excommunicating ſuch as deſerved that puniſhment.

ARCHITECT, a perſon ſkilled in architecture, who not only draws the plans of edifices, but alſo ſuperintends and directs the artificers.

The word is formed from the Greek, αρχος, principal, and τεκτων, workman.

ARCHITECTONIC, ſomething endowed with the power and ſkill of building, or calculated to aſſiſt the architect.

ARCHITECTURE, the art or ſcience of erecting edifices, either for habitation or defence.

Architecture is doubtleſs of very great antiquity, and was, perhaps, preceded only by agriculture itſelf. Hence Theodoret calls the latter the eldeſt ſiſter of architecture. The exceſſive heats of ſummer, the ſeverity of winter, the inconvenience of rain, and the violence of wind, ſoon inſtructed mankind to ſeek for ſhelter, and provide themſelves with proper retreats to defend themſelves againſt the inclemencies of the weather. But theſe at firſt were only ſmall huts, built very rudely with the branches of trees, and very indifferently covered. In the time of Vitruvius, they ſhewed at Athens, as a curious relic of antiquity, the roof of the Areopagus, made of clay; and at Rome in the temple of the Capitol, the cottage of Romulus thatched with ſtraw.

After theſe rude eſſays, buildings of wood were introduced, and theſe ſuggeſted the idea of columns and architraves. The columns were modelled from the trees uſed to ſupport the roof, and the architrave from the large beam laid between the columns and the roof.

But, in conſequence of a continual application to building, the workmen became every day more induſtrious and more expert. Inſtead of thoſe ſlight huts, with which they were at firſt contented, they began to erect walls of ſtone and brick upon ſolid foundations, and to cover them with boards and tiles. In proceſs of time, their reflections, founded on experience, led them to diſcover the juſt rules of proportion, ſo natural to man; the great Author of his being having implanted its principles in his ſoul, to make him ſenſible that he is born for order.

It was therefore by degrees that architecture attained the height of perfection to which the maſters of the art have carried it. It was originally confined to the mere neceſſaries and uſes of life, having nothing in view but ſolidity, healthfulneſs, and convenience. Afterwards the architects laboured to adorn their edifices, and called in the other arts to their aſſiſtance.

Moſes tells us that Cain built a city; and hence we learn both the time when, and place where, architecture had its origin. Aſia was therefore the cradle of architecture; there it had its birth, and there it attained a conſiderable degree of perfection; and thence it ſpread into other parts of the world.

Babylon and Nineveh, the largeſt and moſt magnificent cities mentioned in hiſtory, were built by Nimrod, the grandſon of Noah, and the firſt of conquerors. They were not indeed at firſt carried to that prodigious magnificence which afterwards aſtoniſhed the world; but they were certainly very large and extenſive.

The erection of the famous pyramids, the labyrinth, and a prodigious number of temples in Egypt, together with the amazing obeliſks, which are to this day the admiration and ornament of Rome, ſhew with what ardor and ſucceſs the Egyptians applied themſelves to architecture.

This art, however, is neither indebted to Aſia nor Egypt for that degree of perfection it attained; and there is reaſon to doubt whether the buildings of both were not more remarkable for their enormous magnitude, than valuable for their juſtneſs and regularity. But however that be, it appears from the very names of the three principal orders, that the invention if not the perfection of them, is to be aſcribed to Greece; and that it was ſhe that preſcribed the rules, and ſupplied the models of them. It was in her ſchool that true taſte preſided, and thither we muſt have recourſe, if we deſire to excel.

It is indeed a misfortune that not one ſingle treatiſe written by the Greeks upon architecture, has reached our hands. The only books we have of theirs upon this ſubject, are the ſtructures of thoſe ancient maſters ſtill ſubſiſting, whoſe beauty is univerſally acknowledged, and which have for almoſt two thouſand years been the admiration of all good judges. Theſe ſtructures are ſuperior to all the precepts they could have left us; as practice in every thing infinitely excels theory.

The Romans borrowed the art from the Greeks, and under Auguſtus, when good taſte univerſally prevailed, carried it to a great degree of perfection. But it fell with the weſtern empire, and was not recovered for the ſpace of twelve centuries.

The ravages of the Viſigoths, in the fifth century, deſtroyed moſt of the beautiful monuments of antiquity; and architecture became ſo rude and artleſs, that their profeſſed architects were totally ignorant of juſt deſigning, wherein its whole beauty conſiſts: and hence a new method of building took place, called the Gothic.

Charlemagne did every thing in his power to reſtore architecture; and the French applied themſelves to it with ſucceſs, under the encouragement of Hugh Capet. His ſon Richard purſued the ſame plan; ſo that by degrees the modern architecture became as faulty for its exceſs of delicacy, as the Gothic was before for its maſſineſs.

The architects of the 13th, 14th, and 15th centuries, who had acquired ſo much knowledge in ſculpture, made the perfection of their art to conſiſt wholly in the delicacy and multitude of the ornaments with which they decorated their buildings, with the utmoſt care and ſolicitude, though frequently without either judgment or taſte.

In the two laſt centuries, the architects of Italy, England, and France, employed themſelves wholly in retrieving the primitive ſimplicity and beauty of ancient architecture; and ſo far ſucceeded, that our churches, palaces, &c. are now built after the models of antiquity.

And hence every building is, or ſhould be proportioned to the bulk, ſtrength, delicacy, richneſs, or ſimplicity deſired; and conſequently a different proportion obſerved in the various members of the edifice. In theſe different proportions conſiſt the five orders of architecture, all invented at different times and on different occaſions. Theſe are called the Tuſcan, Doric, Ionic, Corinthian, and Compoſite. See ORDER.

Architecture is alſo divided into civil, military, and naval.

Civil ARCHITECTURE teaches the method of erecting all kinds of buildings, as palaces, churches, private houſes, &c. and the rules to be obſerved are ſolidity, convenience, and beauty; order, diſpoſition, proportion, decorum, and œconomy. Solidity implies the choice of a good foundation, and ſound materials; convenience conſiſts in ſo ordering the parts of an edifice that they may not embarraſs one another; beauty is that agreeable form and pleaſing appearance which it exhibits to the eye of the ſpectator; order gives every part of the building a convenient bigneſs, whether conſidered alone, or in relation to the whole; and the diſpoſition is the agreeable union of all the parts. Proportion is the relation that all the work has to its parts, and which every one ſeparately hath to the whole; decorum teaches the architect to have a regard to deſign, cuſtom, and nature; and œconomy, to conſider the expence, in order to regulate the form and manner of the fabric.

The only entire piece upon architecture among the ancients is that of Vitruvius: and the moſt celebrated of thoſe who have written on that ſubject ſince his time, are, Baptiſta Alberti, Palladio, Scamozzi, Blondel, Goldman, Perrault, Sir Henry Wotton, Sturmius, and Wolfius.

Military ARCHITECTURE is the ſame with what is generally called fortification. See FORTIFICATION.

Naval ARCHITECTURE is the art of building ſhips. See SHIP-BUILDING.

Counterfeit ARCHITECTURE is that which conſiſts of projections, painted either in claro oſcuro, or in colours imitating marble.

ARCHITECTURE *in Perſpective* is a ſort of building, wherein the members are of different modules, and diminiſh proportionally to their diſtance, in order to make the ſtructure appear longer to the view than it really is.

ARCHITRAVE, in architecture, is that part of the order of columns, lying immediately upon the capital. It has its name from repreſenting the principal beam in a timber building.

The word is compounded of the Greek, *αρχος*, chief, or principal; and the Latin, *trabs*, a beam.

This member, when placed over the chimney, is called the mantle-piece, and when over a door or window, the hyperthyron.

ARCHIVAULT, in architecture, implies the inner center of an arch, or a band adorned with mouldings, running over the faces of the arch-ſtones, and bearing upon the impoſts. It has only a ſingle face in the Tuſcan order, two faces crowned in the Doric and Ionic, and the ſame mouldings as the architrave in the Corinthian and Compoſite.

ARCHIVE, or Archives, an apartment in which the records, charters, and other papers of a ſtate or community are depoſited.

The word is formed from the Latin, *arca*, a cheſt.

ARCHMARSHAL, the grand marſhal of the empire; a dignity belonging to the elector of Saxony.

ARCHON, in antiquity, the chief magiſtrate of Athens, after the aboliſhing of monarchical government. It was alſo an appellation given to ſeveral officers, both civil and religious, under the Greek emperors.

The word is Greek, αρχων, and literally ſignifies a governor or commander.

ARCHONTICI, in eccleſiaſtical hiſtory, a ſect of heretics that appeared towards the cloſe of the ſecond century; and were ſo called from their holding that the world was created by angels, whom they called arcontes. They were a branch of the Valentinians.

ARCHPRIOR, a name by which the maſter of the order of the knights-templars was ſometimes called.

ARCHTREASURER, the grand treaſurer of the German empire; a dignity belonging to the duke of Brunſwic, king of Great Britain. It is alſo claimed by the elector palatine.

ARCTIC, in aſtronomy, an epithet applied to the north-pole, and alſo to a ſmall circle of the ſphere parallel to the equator, and 23°. 30′. diſtant from the north-pole. See Pole and Sphere.

The word is formed from the Greek, αρκτικος, which is derived from αρκτος, a bear, becauſe of a conſtellation called by us the little bear, the laſt ſtar in the tail whereof points nearly to the north-pole.

ARCTOPHYLAX, in aſtronomy, the name of a conſtellation otherwiſe called Boötes. See Boötes.

ARCTURUS, in aſtronomy, a ſtar of the firſt magnitude in the ſkirt of Boötes. Its longitude is 20°. 58′. 2″. of ♎, and its latitude 30°. 57′. 0″. N.

ARCTUS, αρκτος, in aſtronomy, the Greek name for the conſtellations called by the Latins, *urſa major* and *minor*, and by us, the great and little bear. See Ursa *Major* and *Minor*.

ARCUATION, in gardening, the method of raiſing trees by layers, which is done in the following manner:

Strong mother plants or ſtools muſt be planted in a clear border, and in a ſtraight line, about ſix feet aſunder. When theſe have ſhot five or ſix main branches from the root, and as many collateral branches, the former muſt be bent to the ground, and there faſtened. The ſmall branches muſt be covered three inches deep upon the joints, and have a large baſon of earth made round them to hold the water.

About the middle of September they may be opened, and if they have taken root may be immediately removed into the nurſery; but if they have not ſufficiently extended their roots, they muſt be ſuffered to remain till the ſpring, and then tranſplanted.

Arcuation, in ſurgery, denotes a diſtortion or incurvation of the bones.

ARCUTIO, the name of a machine conſiſting of a board covered with hoops, and uſed, by the nurſes of Florence, to prevent the child from being overlaid. Every nurſe is obliged to lay her child in an arcutio, under pain of excommunication.

ARDASSES, in commerce, the coarſeſt of all the ſilks brought from Perſia.

ARDEA, the heron, in natural hiſtory, a genus of long-beaked birds; diſtinguiſhed from all others by having the middle toe of each foot ſerrated, or jagged, with a ſeries of ſcales on its outer ſide.

ARDENT, ſomething hot, or as it were burning.

The word is formed from the Latin, *ardens*, which is derived from *ardeo*, to burn.

Ardent *Fever*, a violent burning fever. See Fever.

Ardent *Spirits*, thoſe diſtilled from fermented vegetables; ſo called becauſe they eaſily take fire and burn.

ARDERS, among huſbandmen, implies the fallowings or plowings of grounds. See Fallowing.

ARDO Ventriculi, the cardialgia, or heart-burn. See Cardialgia.

AREA, in a general ſenſe, implies any plain ſurface whereon we walk, &c.

The word is Latin, and properly ſignifies a threſhing-floor.

Area, in geometry, denotes the ſuperficial content of any figure. Thus, if a figure, ex. gr. a field, be in form of a ſquare, and its ſide be 30 feet long, its area is ſaid to be 900 ſquare feet, or it contains 900 little ſquares, each a foot every way.—For the method of finding the areas of figures, ſee each under its reſpective name.

Area, in aſtronomy, the ſpaces which revolving bodies deſcribe by means of rays drawn to the center of force. Thus, if a body revolving about the center of force S, (plate XV. *fig.* 2.) moves in the orbit AMT, the ſpaces ASM, MSA, are thoſe reſpectively deſcribed by the body when arrived at the points M and A, and are exactly proportional to the times of their deſcription.

Area, among phyſicians, the ſame with alopecia. See Alopecia.

ARECA, the fruit of a ſpecies of palm-tree, growing in the Eaſt-Indies. It is in great requeſt by the natives, who are perſuaded that it ſtrengthens the ſtomach, and carries off every thing that might corrupt the gums.

ARENA, ſand, in natural hiſtory. See Sand.

Arena, in antiquity, the place where the gladiators, &c. fought; ſo called from its being always covered with ſand to conceal the blood ſpilt in the combat from the view of the people.

ARENATION, a kind of dry bath, where the patient ſits with his bare feet on hot ſand.

AREOLA, among anatomiſts, the coloured circle ſurrounding the nipple of the breaſt.

AREOPAGUS, or Aræopagus, in antiquity, a ſovereign court at Athens, ſo famous for the juſtice and impartiality of its decrees, that the gods themſelves are ſaid to have ſubmitted their diſputes to its determination.

ARGEA, or Argei, in antiquity, thirty human figures made of ruſhes, and thrown annually by the prieſts or veſtals into the Tiber, on the day of the ides of May.

ARGEMONE, in botany, the thorny Mexican poppy, a genus of plants with roſaceous flowers, and a unilocular capſule for its fruit.

ARGENT, in heraldry, the white colour in the coats of gentlemen, knights, and baronets; the white in the arms of ſovereign princes, being called luna; and that in the arms of the nobility, pearl.

This is expreſſed, in engraving, by the parts being left plain, without any ſtroke from the graver.

ARGENTARIA Creta, in natural hiſtory, an earth perfectly white and pure, found in Pruſſia, and greatly eſteemed for cleaning plate.

ARGENTINA, in natural hiſtory, the name of a fiſh found in ſeveral parts of the Mediterranean. It reſembles a pike, and has an oblong round body without ſcales. It is of a greeniſh aſh-colour above the lateral lines, but below them of a bright ſhining ſilver colour, eſpecially over the covers of the gills. The ſnout is oblong; the mouth of a moderate ſize, without teeth in the jaws, though there are ſix or eight crooked ones near the end of the tongue. The eyes are large, with a ſilver-coloured iris; and the brain may be ſeen through the ſkull. About the middle of the back is a fin, ſupported by ten rays. The tail is forked; but the principal mark that diſtinguiſhes it from all other fiſh, is the air bladder, which is conical at both ends, and outwardly looks as if covered with poliſhed ſhining leaf ſilver. This is made uſe of to counterfeit pearls. It is often brought to the fiſh-markets at Rome.

Argentina, ſilver-weed or wild tanſy, in botany, a low creeping plant, with winged leaves, compoſed of ſeven or eight pair of oblong indented ſegments ſet along a middle rib, with ſmaller portions between, green above, and covered with a ſilver-coloured down underneath: the flowers, which riſe on long pedicles in the boſoms of the leaves, are compoſed each of five gold-coloured petals, with a number of threads in the middle, and followed by a ſmall cluſter of naked ſeeds. It is perennial; common by the ſides of rivulets and in moiſt uncultivated places; and flowers in June.

The leaves of argentina have been generally looked upon as ſtrong aſtringents, and recommended as ſuch in fluxes and hæmorrhages. That they have an aſtringent quality is manifeſt to the taſte, and from their ſtriking a black colour with ſolutions of chalybeate vitriol; but in the leaves in ſubſtance, whether freſh or dry, and in their infuſions, decoctions, and expreſſed juice, the preparations which have been generally made of them, the aſtringency is very weak; and even the extracts made from them, by water and by rectified ſpirit, in which all their active matter is concentrated, are only among the milder ſtyptics or corroborants. The ſpirituous extract is ſtronger than the watery, and in proportionably ſmaller quantity. *Lewis's Hiſtory of the Materia Medica.*

ARGENTUM, ſilver, in natural hiſtory. See SILVER.

ARGILLA, clay. See CLAY.

ARGO, in antiquity, a ſhip or veſſel celebrated among the poets, as being that wherein the Argonauts made their expedition.

ARGO *Navis*, or the ſhip, in aſtronomy, is the name of a conſtellation of fixed ſtars in the ſouthern hemiſphere. The number of ſtars is 8 in Ptolemy's catalogue; in Tycho's 11; and in Mr. Flamſteed's 25.

ARGOL, red tartar. See TARTAR.

ARGONAUTS, in antiquity, a company of illuſtrious Greeks, who embarked with Jaſon, in the ſhip Argo, on an expedition to Colchis, in order to acquire the golden fleece.

ARGUMENT, *Argumentum*, in rhetoric and logic, implies an inference drawn from premiſes, the truth of which is indiſputable, or at leaſt highly probable.

The arguments of orators have particular denominations, according to the topics whence they are derived: thus we meet with arguments from affection, which intereſt the paſſions of the perſon to whom they are addreſſed; arguments *ad hominem*, or thoſe drawn from the profeſſed principles of the auditor, &c.

The arguments of logicians are the ſyllogiſm, enthymem, induction, &c. See SYLLOGISM, ENTHYMEM, &c.

ARGUMENT, in aſtronomy, implies a known arch, by the aſſiſtance of which we ſeek another unknown.

Thus the argument of the moon's latitude is her diſtance from the node; and the argument of inclination is an arch of a planet's orbit, intercepted between the aſcending node, and the place of the planet from the ſun, numbered according to the order of the ſigns.

ARGUMENT alſo implies the abridgement or heads of a book, chapter, poem, &c.

ARGUMENTATION, the act of arguing; and the manner of framing arguments.

ARGUS, in natural hiſtory, the name of an uncommon ſerpent found in Guinea; and ſo called from its being covered with ſpots from the head to the tail, reſembling eyes. On the back there is a double row of them, which are the largeſt, and the ground colour of the ſcales is a bright cheſnut, except on the back between the eyes, where it is of a dark brown.

ARGUS is alſo the name of a very curious ſhell, about three inches long, two in diameter, and ſomewhat leſs in height. The mouth is wide, and the lips are continued at each extremity in the form of a broad ſhort beak, each way. The general colour is yellowiſh, only there are three brown bands of a conſiderable breadth running over it; and the whole ſurface is adorned with a multitude of round ſpots, like eyes, from whence it has its name. It is brought from Africa and the Eaſt Indies.

ARIANS, in eccleſiaſtical hiſtory, a ſect of heretics, who followed the opinions of Arius, a preſbyter of Alexandria, in the time of the patriarch Alexander. He broached his hereſy in the beginning of the fourth century.

The Arians denied the three perſons in the holy Trinity to be of the ſame ſubſtance; aſſerted that there was a time when the ſon was not; that he was created in time, mutable in nature, and, like the angels, liable to ſin; and that being united to human fleſh, he ſupplied the place of a human ſoul, and conſequently was ſubject to ſufferings and pain. In their doxologies they aſcribed "Glory to the Father, through the Son, and in the "Holy Ghoſt."

ARIANISM, the doctrine or tenets of the Arians.

ARIDAS, a kind of taffaty, manufactured in the Eaſt Indies, from a ſhining thread drawn from certain plants; and hence they are ſtiled aridas, or herbs.

ARIES, the ram, in aſtronomy, a conſtellation of fixed ſtars, drawn on the globe in the figure of a ram. It is the firſt of the twelve ſigns of the zodiac, from whence a twelfth part of the ecliptic takes its name; and is marked thus ♈.

The number of ſtars in the conſtellation aries, in Ptolemy's catalogue is 18; in Tycho's 21; and in Mr. Flamſteed's 65.

ARIES, the battering ram. See BATTERING RAM.

ARISH, a Perſian long meaſure, containing about 3197 Engliſh feet.

ARISTA, among botaniſts, a long needle-like beard, which ſtands out from the huſk of a grain of corn, graſs, &c. it is alſo called awn.

ARISTROCRACY, a form of government where the ſupreme power is lodged in the principal perſons of the ſtate, either on account of their nobility, their capacity, or their probity.

The word is Greek, and compounded of *αριστος*, principal, and *κρατεω*, to command.

ARISTOLOCHIA, birth-wort, in botany. See BIRTH-WORT.

ARISTOTELIAN, ſomething that relates to the philoſopher Ariſtotle.

ARISTOTELIAN *Philoſophy*, the philoſophy of Ariſtotle, ſometimes called the peripatetic philoſophy.

The philoſopher, from whom the denomination ariſes, was the ſon of Nicomachus, phyſician of Amyntas, king of Macedonia, born in the year of the world 3566; before Chriſt, 348; at Stagira, a town of Macedonia; or as others ſay, of Thrace; whence he is alſo called the Stagyrite.

At ſeventeen years of age he entered himſelf a diſciple of Plato, and attended in the academy till the death of that philoſopher. Repairing afterwards to the court of king Philip; at his return he found that Xenocrates, during his abſence, had put himſelf at the head of the academic ſect; upon which he choſe the Lyceum for the ſcene of his future diſputations.

It being his practice to philoſophize walking, he got the appellation, Peripateticus; whence his followers were alſo called peripatetics. Though others will have him to have been thus named, from his attending on Alexander at his recovery from an illneſs, and diſcourſing with him as he walked about.

Ariſtotle was a perſon of admirable genius, and of great and various learning. Averrhoes makes no ſcruple to call him, "The genius of nature, the limit of human "underſtanding;" and declares him "ſent by Provi"dence to teach us all that may be known." He is accuſed of a too immoderate deſire of fame, which led him to deſtroy the writings of all the philoſophers before him, that he might ſtand ſingly, and without competitors. And hence, in the ſchools, Ariſtotle is called, The philoſopher. Laertius, in his life of Ariſtotle, enumerates his books to the number of 4000; of which ſcarce above 20 have ſurvived to our age.

This great philoſopher has been deified by ſome, and deſpiſed by others; but a ſhort view of his works will abundantly convince us, that both theſe extremes are ill founded. His firſt eſſays were on oratory, and poetry; which, in all probability, he compoſed for the uſe of his royal pupil, Alexander the Great. Theſe books are maſter-pieces; and his ſtudy of Homer gave him ſo finiſhed a taſte in poetry and rhetoric, that whoever would now ſpeak or write elegantly on thoſe ſubjects, muſt obſerve his precepts; and, perhaps, theſe performances do moſt honour to his memory.

His ethics are very dry, barren, and unfruitful; offer nothing to us, but general views and metaphyſical propoſitions; fitter to adorn the mind and load the memory, than touch the heart, and correct the will: and this ſpirit prevails in all the moral writings of our philoſopher. A ſketch of his principal doctrines will ſufficiently prove this aſſertion. 1. The happineſs of man, ſays he, conſiſts not in riches, pleaſures, power, nobility, nor philoſophichal ſpeculations; but rather in certain habits of the ſoul, which render him more or leſs perfect. 2. Virtue is full of charms; conſequently a virtuous life muſt be happy. 3. Though virtue be ſufficient of itſelf, yet it cannot be denied, but that riches, honours, a noble birth, beauty of body, and things of this nature, greatly contribute to advance the happineſs of man. 4. Every virtue keeps the mean betwixt two extremes: thus courage is the mean betwixt fear and raſhneſs; liberality, betwixt avarice and extravagance, &c. from whence we may conclude, that the number of vices are twice the number of virtues; becauſe every virtue has on each ſide an oppoſite vice. 5. He diſtinguiſhes two ſorts of juſtice; the one he calls univerſal, the other particular. Univerſal juſtice tends to the preſervation of civil ſociety, by the reſpect and obedience it inſpires and enjoins for the laws. Particular juſtice conſiſts in rendering every man his due; and is of two ſorts, diſtributive and communicative. Diſtributive juſtice diſpenſes rewards and puniſhments to every citizen, according to his merit, and is founded on a geometrical proportion. Communicative juſtice has commerce for its object; conſiſts in rendering to every man his due; and muſt proceed according to arithmetical proportion. 6. Friendſhip ariſes either from the pleaſure we find in a perſon's converſation, the profit which may reſult from it, or from the merit of ſome eminent qualities, founded on the virtue we diſcover in the object: this laſt is true friendſhip; benevolence, properly ſpeaking, is not friendſhip, though it leads to it.

Ariſtotle has ſucceeded much better in his logic than in his ethics. His logic diſcovers all the principal ſprings of the art of reaſoning; he deſcends ſoon to the thoughts of man; diſtinguiſhes his ideas; ſhews their connection; purſues them through all their deviations and ſeeming contrarieties; and at laſt reduces them to a fixed point. If the extent of the mind could have been known, Ariſtotle would certainly have diſcovered it. Is it not ſurpriſing that, by the different combinations he has made of all the forms the mind can put on in reaſoning, he has confined it in ſuch a manner, by the rules he has laid down, that it can never deviate from its object, nor reaſon abſurdly? But this method, though ſo much extolled by all philoſophers, is not free from faults. 1. He is too prolix; all his books of categories might be reduced to a few pages; the ſenſe is drowned in a ſuperfluity of words. 2. He is obſcure and intricate; he expects you to gueſs at his meaning; would have his reader, like himſelf, know what he intended. A man of the beſt capacity muſt often deſpair of having fully underſtood him in his doctrine of the analyſis and ſyllogiſm.

Let us now conſider Ariſtotle's natural philoſophy; and here we ſhall principally follow the famous Lewis Viſis, who has proceeded very methodically on the ſubject, by taking notice of all this philoſopher's phyſical works; he begins with his eight books of Natural Principles; which ſeem rather ſo many different memoirs, than a book wrote on one and the ſame plan. Theſe eight books treat of bodies extended in general, which is the object of phyſics; and, in particular, of the principles of bodies, and all that is connected with theſe principles, as motion, place, time, &c. Nothing is more confuſed than the long detail he gives us; his definitions render things, clear and evident in themſelves, obſcure and unintelligible. Ariſtotle begins with condemning all the philoſophers who went before him, and even in very harſh terms, for having admitted only one principle. With regard to himſelf, he lays down three principles, which are matter, form, and privation. Matter, according to him, is the general ſubject on which nature operates: this matter is eternal; the parent of all things; which eagerly longs for motion, and deſires to be united to form. Ariſtotle's definition of his firſt matter is a kind of jargon; he defines it in theſe terms: "That which "has neither quality or quantity, or any thing by which "its being can be determined." If he only means, according to his method of conſidering things, firſt in a general view, and afterwards deſcending to particulars, that this firſt matter had no other foundation than his own conception, nor exiſtence, but in an arrangement of ideas, to reaſon on the ſubject, it may be granted him: but then this firſt matter is an imaginary being, a mere abſtract idea, which exiſts no more in general than a flower, or man, which are but parts of the univerſe. Some are of opinion Ariſtotle meant, by his firſt matter, not only body in general, but a certain uniform paſte, which, like yielding wax, took any impreſſion; out of which all things were formed, and into which they return at their diſſolution; that all bodies were the ſame, and differed only with reſpect to their figure, quantity, motion, or reſt, which are all accidents. This opinion, which owes its origin to Ariſtotle, appeared ſo ſpecious to all philoſophers, both ancient and modern, that it has been generally adopted; though nothing can be more falſe, as is abundantly proved by experiments; for, in conſequence of this doctrine, if motion produced out of this firſt matter, this original paſte or wax, an animal, a tree, or a maſs of gold; take away this motion, the animal, the tree, the gold, muſt return to their primeval paſte; Empedocles, Plato, Ariſtotle, and the ſchoolmen, aſſert this: but it is falſe. The organized body, on its diſſolution, ſeparates into different maſſes, ſkin, hair, fleſh, bone, &c. The mixed body reſolves itſelf into water, ſand, ſalt, and earth: but the moſt powerful diſſolvents, and the hotteſt fire, can never produce any change in theſe ſimple bodies. Sand remains ſand, iron remains iron; gold, purified, ſuffers no change; the caput mortuum will always remain a caput mortuum, though tried and tortured a thouſand ways. Chemical experiments have proved this paſt all doubt: we can go no further, the ſeparate elements are permanent, and incapable of change; for this reaſon, that the univerſe, which is compoſed of them, may receive different forms, by their being blended together; and yet be durable, as the principles which form its baſis. As to form, Ariſtotle's ſecond principle, he looks on it as a ſubſtance, an active, conſtituent principle of bodies, which operates on matter. It follows from this poſition, that there muſt be as many natural forms, which are born, and die by turns, as there are primitive and elementary bodies. As to privation, ſays Ariſtotle, it is not a ſubſtance; it is even, in ſome reſpects, a ſort of nothing: in ſhort, bodies which receive ſuch a form, are ſuch as could never have had that form before, but muſt even have had one abſolutely contrary to it. Thus the dead and living are directly oppoſite.

Theſe three principles premiſed, Ariſtotle proceeds to the explanation of cauſes, which he treats of diſtinctly enough; but almoſt always without mentioning the firſt cauſe, which is God. Some have taken occaſion from hence to accuſe him of atheiſm; but we are of a different opinion. Ariſtotle aſſerts, nature is an effective principle, a plenary cauſe, which renders all bodies, wherein it reſides, capable of motion or reſt in themſelves: all bodies which have this power, that cannot in one ſenſe be annihilated, and this tendency to motion, which is always equal, are properly called ſubſtances. Nature, conſequently, is another principle of Ariſtotle; and nature is a term by which he could mean nothing but the deity; wherefore he did not miſtake the firſt cauſe; but his commentators puzzled themſelves, and the ſchoolmen ran into ſo many abſurdities, by miſunderſtanding him.

After having explained the efficient cauſe of all power diſtributed throughout the univerſe, Ariſtotle proceeds to define motion; but though the efforts of a great genius are conſpicuous, his definition is very lame and imperfect. The farther he advances, his reaſoning becomes more clear; finite and infinite, the vacuum and atoms, ſpace and time, place and the bodies contained in it, preſent themſelves to his view; he makes no confuſion; one propoſition leads to another; and, though the progreſs be extremely rapid, the connection is very plain.

The doctrine contained in his two books of generation and corruption, neceſſarily depends on his principles which we have already explained. Before Socrates, the prevailing opinion was, that nothing abſolutely died or periſhed, but ſomething was again produced from it;

that all the changes which happen in bodies were only another arrangement, a different diſtribution of the parts of matter which compoſed theſe ſame bodies: they aſſerted that increaſe and diminution, diviſion and re-union, ſeparation and mixture, accounted for all the changes viſible in the univerſe. Ariſtotle rejected all theſe notions, though very ſimple in themſelves, and therefore probable; and eſtabliſhed the doctrine of generation and corruption, properly ſo called. He obſerved new beings produced from the womb of nature continually, which periſhed in their turns. Two things led him into this way of thinking: 1. He imagined the matter of all bodies the ſame; that they only differed in form, which he looked on as their eſſence. 2. This doctrine of privation teaches, that contraries are produced by their contraries, as white by black; whence it follows, that white muſt be annihilated before black can ſucceed. To clear up this ſyſtem, we ſhall make two remarks: 1. That generation and corruption have no connection with the other modifications of bodies, as increaſe, decreaſe, tranſparence, conſiſtence, &c. under all theſe modifications. The firſt form is not effaced, though infinitely diverſified. The ſecond remark, which naturally reſults from the firſt, is, that, as all the diverſity of nature conſiſts in generation and corruption, ſimple and primitive beings only can be ſubject to them; all other bodies are only mixtures, and various combinations of theſe firſt. Though nothing can be more chimerical than this part of Ariſtotle's ſyſtem; yet it has perplexed the ſchoolmen, who have multiplied a number of nonſenſical terms, ſuch as *forma ſubſtantialis, modalitas, &c.* and continually diſputed about it, without any meaning.

Ariſtotle does not content himſelf with exhibiting a general theory in phyſics, but deſcends to particulars; his meterology is held by father Rapin to be more clear than all that has been advanced by the moderns on the ſubject. It indeed muſt be owned he accounts for rain, hail, dew, &c. in an extraordinary manner, conſidering his ignorance of the experiments the moderns have made, and ſome diſcoveries, owing to time and chance. His account of the rainbow is ingenious, and really differs but little from that of Deſcartes. His definition of the wind is this, that it is a current of the air; and he ſhews, that its direction depends on an infinity of cauſes, extraneous and little known; which, ſays he, hinders me from giving a general ſyſtem of it. With regard to his hiſtory of animals, it will be ſufficient to ſay, it is highly approved of by M. de Buffon.

Thus we have given ſome account of all his works. Let us now take a ſhort view of his doctrines. The matter, according to Ariſtotle, which compoſes all bodies is the ſame, and only owes its different forms to the different combination of its parts. He admits of four elements, fire, air, water, and earth; which, according to him, are ſufficient to form all ſublunary bodies; but the beauty of the heavens made him ſuſpect them to be formed of finer materials; and, therefore, he ſuppoſed a ſort of fifth element, the quinteſſence of the other four, for the conſtruction of the heavens: and perhaps, when he had invented a new word, thought, like ſome moderns, he had made a diſcovery of ſomething new; and that what ſubſiſted in his imagination, muſt conſequently alſo ſubſiſt in the univerſe. But neither the authority of Ariſtotle, or any other philoſopher, nor the pretended evidence of their arguments, can convince us of the reality of what they imagined. From theſe five principles, fire, air, water, earth, and a quinteſſence of theſe, Ariſtotle ſuppoſed the whole univerſe to be formed. Of this quinteſſence, or fifth body, being, or eſſence, for (literally the term ſignifies no more, though taken in a metaphorical acceptance, it is generally underſtood to convey another idea) he ſuppoſes the celeſtial bodies formed; and to this he aſcribes a circular motion. To the four elements, of which he ſuppoſes all ſublunary bodies compoſed, he aſſigns only a rectilinear motion. The fifth eſſence has neither gravity nor levity, is incorruptible and eternal; always continues an equal and uniform motion; whereas, of the four elements, two deſcend and gravitate towards the center, two aſcend and ſeek the circumference; yet they may change their places, and indeed often do ſo, becauſe of the facility they have of tranſforming themſelves by rarefaction, condenſation, &c.

This premiſed, Ariſtotle aſſerts the univerſe is not equally under the government of God: notwithſtanding he is the general cauſe of all, the celeſtial bodies only are worthy his care and attention; but the earth and ſublunary beings are below his notice. Diogenes Laertius tells us, it was the opinion of Ariſtotle, that the heavenly bodies were regulated by the deity; that the earth and ſublunary beings were governed by a kind of ſympathy with the celeſtial bodies, and influenced by them. This chain of reaſoning infers the mortality of the ſoul, and excludes free agency. A prevailing notion among all the ancient philoſophers, that the ſoul was a particle of the divine being, and ſhould return to the being from whence it proceeded after certain revolutions, contributed not a little to confirm Ariſtotle in this notion.

The falſe ideas this philoſopher had conceived of motion, had led him into an opinion that the world was eternal. Motion, ſays he, muſt have been eternal, conſequently the world wherein it ſubſiſts muſt have been ſo too.

We have now ſeen enough of the doctrine of Ariſtotle to be convinced he is no more to be charged with atheiſm than almoſt all the other ancient philoſophers, who were infected with the ſame errors. Ariſtotle repreſents God as an immaterial and intelligent Being, the firſt mover of all things, who could not be moved himſelf: ſhould it be aſked, what can be thought of Ariſtotle's creation? The anſwer is eaſy; for he admits, if there had been nothing in the univerſe but matter, it could not have been formed without ſome original firſt cauſe. This plainly infers a deity, and wipes off the imputation of atheiſm, which ſome would have fixed on him. He only differs in opinion from his maſter Plato in this; Ariſtotle thought the world a natural and powerful emanation from the deity, like light from the ſun; whereas Plato thought the world was not an eternal and neceſſary, but voluntary and deliberate choice of the deity. The doctrine of the creation in both makes the world eternal, and is very different from that of Moſes, in which God is left ſo free with regard to creating the world, that he might have left it eternally in its original chaos.

But if Ariſtotle be acquitted of atheiſm, becauſe he admits a firſt cauſe, and makes God the author and firſt mover of all things; yet his notions tend directly to ſubvert and deſtroy the liberty of his agency; becauſe, ſays he, motion impreſſed on matter did not proceed from his will, but the neceſſity of his nature; ſo that his god is diveſted of all the attributes we juſtly aſcribe to the divine being. Notwithſtanding theſe abſurdities, which ſtrike at the root of the Chriſtian religion, ſome eminent men of the Romiſh perſuaſion have been ſo prejudiced in favour of his philoſophy, that his picture has been drawn in the ſame piece of painting with that of the Saviour of mankind: nay, have been wicked and weak enough to place his writings on the level of holy writ. In latter ages, even after the revival of learning in Italy, ſome have not ſcrupled to place him among the number of the bleſſed. We have two books, yet extant, written expreſsly on this ſubject, one entitled, "The ſalvation of Ariſtotle," which the divines of Cologne are ſaid to have publiſhed; the other, by Lambert Dumont, profeſſor of philoſophy, intitled, "What may moſt probably be advanced concerning the ſalvation of Ariſtotle, drawn from the proofs of Holy Scripture, and borrowed from the teſtimonies of the foundeſt body of divines." Strange infatuation!

We cannot conclude this article, without giving an abſtract of the ingenious parallel father Rapin has drawn between Ariſtotle and Plato. They both, ſays he, poſſeſſed an uncommon and elevated genius. The mind of Plato was, it is true, more refined, but Ariſtotle's more penetrating and profound. Plato's imagination is lively, copious, fruitful in invention, idea, and expreſſion: he gives every ſubject he treats of a thouſand different turns, ſets it in a thouſand lights, and all are pleaſing: but, after all, this is nothing but imagination. Ariſtotle is crabbed and dry, but what he ſays, carries the force of reaſon with it. His diction, though pure, is harſh, and his natural or affected obſcurities perplex and tire his readers. Plato has a delicacy in his thought and expreſſion;

preſſion; Ariſtotle ſeems to avoid this, in order to be more natural: his ſtile is ſimple and even, but cloſe and nervous; that of Plato pompous and elevated, but looſe and diffuſive. In ſhort, Plato's principal intention ſeems to have been elegance of diction: Ariſtotle's ſolid reaſoning.

Of the Reſtorers of the ARISTOTELIAN *Philoſophy.*—Perhaps philoſophy was never ſo much cultivated as under the Roman emperors; yet the hiſtory of thoſe times ſufficiently demonſtrate, that it by no means made ſo great a progreſs as might have been expected from the encouragement it received. An inundation of Barbarians deſtroyed the Roman empire, and philoſophy became the companion of its fall. Ignorance ſucceeded, and the only ſtudy in repute, for ſome time, was a kind of logic, that conſiſted in ſubtilties and diſtinctions which ſignified nothing. On the revival of learning, ſome men of letters undertook to oblige the world with a correct tranſlation of Ariſtotle's works into Latin; former tranſlators had given his diſciples a mean opinion of this great philoſopher, and had rather exhibited their own Gothic taſte than Ariſtotle's genius. But the reſtoration of learning was too great a work for perſons in a private ſtation; princes therefore intereſted themſelves in it, procured manuſcripts out of the Eaſt, and cauſed them to be tranſlated and publiſhed. Pope Paul V. acquired immortal honour by the encouragement he gave to all undertakings of this kind. He was paſſionately fond of literature in general, and of Ariſtotle's philoſophy in particular. Men of learning increaſed, and conſequently tranſlations. Averrhoes, till then, had been thought Ariſtotle's beſt commentator, but, as learning improved, taſte refined; they thought Averrhoes retained ſomewhat of barbariſm, and therefore choſe Alexander to explain Ariſtotle in the Lycæum, as a man of more elegance and politeneſs. Averrhoes and Alexander were without compariſon the moſt eminent in the Peripatetic philoſophy; but their opinions with regard to the ſoul were not orthodox: for Alexander thought it mortal, and Averrhoes, though he acknowledged the ſoul immortal, yet meant only an univerſal ſoul, of which all men partook. Theſe opinions ſpread greatly in the time of Thomas Aquinas, who refuted them very fully. The ſect of Averrhoes, however, prevailed ſo much in Italy, that pope Leo X. thought proper to put a ſtop to the propagation of doctrines ſo oppoſite to Chriſtianity, and condemned the opinion of Averrhoes as impious, in the ſecond Lateran council. Some profeſſors, thinking the fulminations of the church inſufficient to make men of learning lay aſide theſe dangerous opinions, oppoſed the Platonic philoſophy as the beſt remedy to this growing evil: ſome, finding many beauties in the philoſophy of Ariſtotle, and highly reverencing the doctrines of the Goſpel, were for reconciling him with Plato; and others ſoftened the expreſſions of Ariſtotle, and gave them a religious turn.—It may not be diſagreeable to mention ſome of thoſe who diſtinguiſhed themſelves in thoſe controverſies.

Among the Greeks who left their own country, and came to tranſplant learning into Italy, Theodorus Gaza was one of the moſt eminent; he underſtood the opinions of every ſect of philoſophy, was a great phyſician, a profound divine, and remarkable for his ſkill in polite literature. He was a native of Theſſalonica; but the victorious arms of Amurath having ravaged all the Eaſt, obliged him to ſeek refuge in Italy. Cardinal Beſſarion received him with friendſhip, and gave him prieſt's orders. He tranſlated Ariſtotle's Hiſtory of Animals, and the Problems of Theophraſtus on Plants. His tranſlations ſo highly pleaſed the cardinal, that he boaſted of them as equal to the original. But though he is eſteemed one of the beſt tranſlators; yet, as Eraſmus juſtly obſerves, his Latin phraſe has a tincture of Greek, and his opinions the tincture of the age he lived in. Coſmo of Medicis joined with cardinal Beſſarion in ſerving Theodorus, and advancing his fortune; but Greek and Brutian ſycophants, together with his own want of œconomy, reduced him to extreme poverty: under theſe circumſtances he ſet about a new tranſlation of Ariſtotle's Animal Hiſtory, which he dedicated to Sixtus IV. from whom he only received a preſent of a hundred piſtoles, which he threw with indignation into the Tiber, and withdrew himſelf from Rome into the country of the Brutii, where he would have ſtarved, had not the duke of Ferrara taken notice of him. He died of vexation ſoon after; a remarkable example of the changes of fortune.

George of Trebizond, as well as Gaza, applied himſelf to the Peripatetic philoſophy; gave himſelf this title, becauſe it was the country of his anceſtors, for he was a Cretan by birth. He went into Italy, while the council ſat about reuniting the Latin and Greek churches. He was at Venice firſt, from whence he went to Rome, where he taught rhetoric and philoſophy. He was ſo zealouſly fond of Ariſtotle as to defend him in every particular: and wrote the bittereſt invectives againſt the followers of Plato, which created him many enemies. Nicholas V. his patron, notwithſtanding his inclination to the Ariſtotelian philoſophy, diſapproved of his conduct. Cardinal Beſſarion was the moſt powerful antagoniſt that took up the pen againſt him; he refuted him under the title of the ſlanderer of Plato: but he had a more formidable enemy than the cardinal, neceſſitous poverty; for this diſpute unhappily deprived him of all ſupport. Poſterity will more eaſily pardon his prejudices againſt the followers of Plato in his age, than the incorrectneſs of his verſions. His tranſlations of the Laws of Plato, and Ariſtotle's Hiſtory of Animals, are deficient in many reſpects; inattention, want of erudition, and honeſty, are too frequently evident: for he took the liberty of altering the text, leaving out many things of conſequence, and changing others; as may be ſeen by the tranſlation Euſebius has given us. Thus we ſee, on the revival of learning, men of letters were divided between Plato and Ariſtotle; both ſides caſt the ſevereſt reflections on each other, which is the caſe of all parties; but neither are to be regarded more than reaſon decides in their favour.

The Ariſtotelian philoſophy, however, was continued in vogue till Des Cartes demoliſhed it; though he did not ſubſtitute any thing more rational in its ſtead.

ARISTOTELIAN *Wheel, rota Ariſtotelica.* See ROTA.

ARITHMETIC, the art or ſcience of computing by numbers.

The word is Greek, *αριϑμητικη*, and derived from *αριϑμος*, number.

We have very little intelligence with regard to the invention of this ineſtimable ſcience; hiſtory being ſilent both with regard to the author and fixing the time. Some attribute it to Seth, others to Noah, and the Turks to Enoch, whom they call Edris. Many imagine it had its riſe with the introduction of commerce, and conſequently fix its epocha with that of the Tyrians, who did not begin to flouriſh till about a thouſand years after the flood. Joſephus tells us, that Abraham taught the Egyptians arithmetic during the time of his ſojourning in their country: though Pliny and Strabo ſay, that the inundations of the Nile gave occaſion to their inventing both arithmetic and geometry. But, however that be, it is certain both theſe ſciences were held in the higheſt veneration, and committed to the care of their prieſts, who founded their theology on them.

The Greeks owed their knowledge in arithmetic to the Egyptians; and Pythagoras built his philoſophical ſyſtem upon numbers, affirming that the nature of numbers extends through the whole univerſe, and that the knowledge of numbers is the knowledge of the deity.

The ancient arithmetic, however, fell far ſhort of the modern; their notation was very imperfect, and conſequently the operations abſtruſe and tedious. They wanted the cypher, or a character that of itſelf ſignifies nothing, to fill up a place, and change the value of their numbers in a decuple progreſſion, their ſeries extending only to nine.

We owe our preſent notation to the genius of the eaſtern nations, and received it from the Arabians, who learned it from the Indians. But when or by whom it was invented cannot be known. It was known in Europe before the year 1000, and in Britain before 1150.

The oldeſt treatiſe extant on the theory of arithmetic is the 7th, 8th, and 9th books of Euclid's Elements; where he has delivered the doctrine of proportion, and that of prime and compoſite numbers. The next of whom we know any thing, is Nichomachus the Pythagorean,

rean, who wrote a treatiſe on the theory of arithmetic, conſiſting chiefly of the diſtinctions and diviſions of numbers, into certain kinds and claſſes, as plain and ſolid, triangular, quadrangular, and the reſt of the ſpecies of figurate numbers. The arithmetic of Nicomachus was publiſhed at Paris in the year 1538. Boethius the philoſopher, who lived at Rome in the time of Theodoric the Goth, is the next remarkable writer on this ſubject. He is ſuppoſed to have ſeen and copied moſt of his work from Nicomachus.

After the Arabian notation was known in Europe, we find many writers both upon the theory and practice; the firſt conſiderable author is Jordanus of Namur, who flouriſhed about the year 1200. His arithmetic was publiſhed and demonſtrated by Johannes Faber Stapulenſis, in the fifteenth century, ſoon after the invention of printing.

As learning advanced in Europe, ſo did the knowledge of numbers, which by degrees received great improvements: but it would be impoſſible to trace out every ſtep of theſe improvements. In Italy were Lucas de Burgo, and Nicholas Tartaglia; in France, Clavius and Ramus; in Germany, Stifelius and Heniſchius; in England, Buckley, Diggs, and Record. All theſe, and many others flouriſhed before the year 1600; ſince that time our writers are almoſt innumerable; but the moſt complete treatiſe upon this ſubject is that of the ingenious Mr. Malcolm, which appeared in the year 1730.

The fundamental rules of arithmetic are four, namely, addition, ſubtraction, multiplication, and diviſion. See each under its proper article.

But beſides theſe, there are other rules contrived for facilitating computations of every kind; as the rule of proportion, rule of three, or golden rule; the rules of fellowſhip, barter, exchange, intereſt, extraction of roots, &c. which the reader will find under the ſeveral heads of PROPORTION, FELLOWSHIP, INTEREST, &c.

Binary ARITHMETIC. See BINARY.

Common ARITHMETIC, comprehends, beſides the doctrine of integers, that of broken numbers, or fractions. See FRACTION.

Decadal ARITHMETIC, the ſame with common arithmetic, or that performed by nine figures and a cypher.

Decimal ARITHMETIC, the doctrine of decimal fractions. See DECIMAL.

Dyadic ARITHMETIC, the ſame with binary arithmetic. See BINARY.

ARITHMETIC *of Infinites*, the doctrine of infinite ſeries. See the article SERIES.

Inſtrumental ARITHMETIC, that performed by means of inſtruments, as rules, ſcales, Napier's bones, &c.

Literal or *Specious* ARITHMETIC, that performed by the letters of the alphabet. See ALGEBRA.

Logiſtical or *Sexageſimal* ARITHMETIC, the doctrine of ſexageſimal fractions. See SEXAGESIMAL.

Univerſal ARITHMETIC, a name given by Sir Iſaac Newton to algebra, or the calculation of quantities in general. Nor did that great man, whoſe elevated genius and profound penetration ſeem to have traced all the ſciences to their true metaphyſical principles, give it this title without ſufficient reaſon.

Common arithmetic has two kinds of principles; the firſt are general rules, independent of the characters made uſe of to expreſs numbers; the ſecond are rules which depend on theſe characters, and are properly called rules of arithmetic. The former contain only the general properties of proportions, and take place univerſally, be theſe proportions ſtated how they will.

Hence it follows, that by noting numbers by general expreſſions, though they do not denote one number more than another, we may form certain rules relative to operations, which may be performed by numbers ſo expreſſed. Theſe rules ſhew the reſult of one or more operations performed by numbers expreſſed in a general manner, and in the moſt ſimple method; and this reſult is properly nothing more than an arithmetical operation, expreſſed in characters, which will vary according to the different arithmetical values we aſſign the quantities ſubſtituted for numbers.

In order to ſet this idea of algebra in a clearer light, it may not be amiſs to mention, in a curſory manner, the four common rules of arithmetic. Addition conſiſts in adding any numbers propoſed into one total, without any other operation. If, for example, it were required to add two diſſimilar quantities together, as a and b, we ſet them down ſimply $a+b$, the reſult of which is nothing more than an indication, that if a repreſents a certain number, and b another, theſe numbers muſt be added together. The expreſſion $a+b$ is therefore nothing more than an indication of an arithmetical addition, the ſum of which will be different, according to the different arithmetical values aſſigned to a and b. Suppoſe it were required to add $5a$ to $3a$, we may write $5a+3a$; but it is plain that this may be expreſſed in a more ſimple manner; viz. $8a$; and conſequently the arithmetical operation ſhould be expreſſed in that manner.

Hence it follows, that addition in algebra expreſſes the ſum or aggregate of ſeveral numbers, generally in the moſt ſimple manner, and ſaves the arithmetician as much labour as poſſible.

In ſubtraction, the thing is the ſame; for if it be required to ſubtract b from a, we write $a-b$; becauſe it is impoſſible to expreſs this operation in a more ſimple manner: but ſhould it be required to ſubtract $3a$ from $5a$, it would be improper to write $5a-3a$; becauſe, if a had any numerical value, it would occaſion the trouble of ſeveral arithmetical operations; but ſimply $2a$, which is more convenient in calculation.

The ſame thing is true in multiplication and diviſion. If we would multiply $a+b$, by $c+d$, we might write indifferently $\overline{a+b}\times\overline{c+d}$, or $ac+bc+ad+bd$; though the firſt method ſeems the more proper, becauſe it requires fewer arithmetical operations: in the former there are only two additions and one multiplication neceſſary; in the latter, three additions and four multiplications. But if it ſhould be required to multiply $5a$ by $3a$, we ſhould write $15a$, and not $5a\times3a$; becauſe the firſt has only two arithmetical operations, and the ſecond three. In the ſame manner, to multiply $a+b$ by $a-b$, we ſhould write $aa-bb$; becauſe this reſult would be more commodious than $aa+ab-ab-bb$, and at the ſame time furniſhes a uſeful theorem, namely, that the product reſulting from the ſum of two numbers, multiplied by the difference of the ſame numbers, is equal to the difference of their ſquares.

In diviſion, inſtead of writing $\frac{20ab}{5b}$, we ſhould ſet down ſimply $4a$; but to expreſs the diviſion of ab by cd, we muſt write $\frac{ab}{cd}$; becauſe a more ſimple expreſſion cannot be found.

Hence it is evident that Sir Iſaac Newton was in the right to call algebra univerſal arithmetic; becauſe it exhibits all the general and common rules of every kind of arithmetic, in a more clear, conciſe, and ſimple method.

But it may be aſked, why we ſhould have recourſe to perplexity? In all arithmetical queſtions the numbers are expreſſed; of what uſe therefore can it be to give them a literal expreſſion?

The anſwer is very eaſy: there are queſtions far more complicated; and in the ſolution of theſe we are obliged to form combinations, of which the number or numbers ſought muſt form a part. We muſt therefore be poſſeſſed of an art, whereby we may repreſent theſe combinations without knowing the number ſought; and conſequently expreſs theſe numbers by characters not numerical: becauſe it would be very improper and inconvenient to expreſs an unknown number by a numerical character, which we had no reaſon to expect would be its real value.

ARITHMETICAL, ſomething belonging to, or performed by arithmetic.

ARITHMETICAL *Complement of a Logarithm, Sine, Tangent, &c.* the ſum or number which a logarithm, &c. wants of 10,000000.

ARITHMETICAL *Mean.* See MEAN.

ARITHMETICAL *Progreſſion.* See the article PROGRESSION.

ARITHMOMANCY, a ſpecies of divination performed by numbers.

The word is Greek, *αριϑμομαντεια*, and compounded of *αριϑμος*, number, and *μαντεια*, divination.

ARK, ARC, or ARCH. See the article ARCH.

ARK, in the ſcripture language, implies a kind of veſſel, made by the command of God himſelf, for preſerving Noah and his family, together with the ſeveral ſpecies of animals, from the univerſal deluge.

The word is formed from the Latin, *arca*, which ſignifies a coffer.

The ancients inform us, that the Egyptians uſed barks made of bulruſhes on the Nile; and that theſe barks were of an oblong ſquare figure, and ſo light as to be carried by a ſingle man.

There is all the reaſon in the world to think that Noah's ark was made in the form of theſe Egyptian boats, but of an infinitely larger ſize. If we reckon the Hebrew cubit at 20 inches and a half, Engliſh meaſure, the length of the ark muſt have been 512 feet 6 inches; its breadth, 85 feet 5 inches; its height, 51 feet 3 inches; and its whole capacity, or hollow part of the ark, 229822 feet 4 inches nearly. The covering of the ark had doubtleſs ſomething of a declivity, in order to carry off the water that fell upon it. The height of it might be divided into four ſtories, allowing three cubits and a half to the firſt, ſeven to the ſecond, eight to the third, and five and an half to the fourth, and leaving the remaining five cubits of the thirty in height for the thickneſs from top to bottom, and the three bridges or floors of the three laſt ſtories.

The firſt of theſe ſtories might be the bottom, or what is called the keel of ſhips. The ſecond might be uſed for a granary or magazine. The third might contain the ſtables; and the fourth, places for the fowls. But, the keel not being reckoned as a ſtory, and ſerving only for a conſervatory of freſh water, Moſes ſays, that there were but three ſtories in the ark, and if interpreters ſet down four, they include the keel. In the ſtables, the four-footed beaſts were lodged, and in the voleries, the birds: ſome reckon as many ſtables or ſtalls as there were ſorts of beaſts, which is not at all neceſſary; becauſe there are many kinds of birds and beaſts which uſe the ſame food, and therefore may live very well together.

The number of beaſts which muſt have entered into the ark, is not ſo great as might be imagined. We are not acquainted with above an hundred and thirty ſpecies of four-footed beaſts; nor do we know of a greater number of birds; and with regard to reptiles not more than thirty ſpecies. We know only ſix ſpecies of beaſts larger than an horſe. There are very few equal to this creature, and many much leſs, and which are under the ſize even of ſheep: ſo that all the four-footed beaſts, including three thouſand ſix hundred and fifty ſheep, which may be ſuppoſed neceſſary for the nouriſhment of ſuch animals as live on fleſh, take up ſcarce any more room than an hundred and twenty oxen, three thouſand ſeven hundred and thirty ſheep, and fourſcore wolves.

Of birds or fowls few are larger than the ſwan, and almoſt all are leſs.

As for reptiles, or creeping animals, their number is not great. They generally are ſmall. Many of them can live in water, and conſequently it was unneceſſary to bring them into the ark.

All the four-footed beaſts might have been eaſily lodged in ſix and thirty ſtables; and all the birds in as many voleries, allowing for each ſtable and volery, five and twenty feet and an half in length, nine and twenty in width, and thirteen and an half in height.

There might be more than thirty one thouſand, one hundred and ſeventy four buſhels of freſh water in the keel; which is more than ſufficient for four times as many men and beaſts to drink in one year, as were in the ark.

The granary and magazine, which was in the firſt ſtory, might contain more proviſions than were neceſſary for the nouriſhment of all the animals in the ark for one year; whether they all lived on hay, fruits, and herbs; or whether there were ſheep deſigned for the food of ſuch animals as live on fleſh.

Beſides the places requiſite for the beaſts and birds, and their proviſions, Noah might ſpare room in the third ſtory for ſix and thirty cabbins to depoſit his houſhold utenſils, the inſtruments of huſbandry, grains and ſeeds to ſow the earth with after the deluge. He might make room in it for a kitchen, a hall, four chambers, and a ſpace of about eight and forty cubits in length to walk in. The reader may conſult M. le Pelletier's work upon Noah's ark, and that of John Buteo on the ſame ſubject.

There are ſeveral difficulties propoſed with relation to Noah's ark. For example, one queſtion is, How long time Noah was employed in building it? Interpreters generally believe, that he was an hundred and twenty years; and this opinion is founded upon the following words of Gen. vi. ver. 3. "My ſpirit ſhall not always "ſtrive with man; his days ſhall be an hundred and "twenty years." Some have pretended, that God in this deſigned to declare, that there were not above an hundred and twenty years to the deluge, and that this time was neceſſary for Noah to make his preparations, build the ark, preach repentance to mankind, and collect together the proviſions and animals which were to be conveyed into the ark.

But how ſhall we be able to reconcile all this to what is elſewhere ſaid, of Noah's being five hundred years old when he had Shem, Ham, and Japhet? And when God commanded him to build the ark, he ſaid, thou, and thy ſons, and thy wife, and thy ſons wives with thee. Noah therefore, at that time had not only his three ſons, who were not born till after the five hundredth year of his age, but his three ſons were all married; and it is certain that the deluge happened in the ſix hundredth year of Noah. It is impoſſible therefore that he ſhould have received orders to build the ark an hundred years before the deluge.

Some of the ancient fathers reply, that the five hundred years of Noah, mentioned in chap. v. ver. 22. of Gen. are ſet down here for five hundred and twenty; a round number for a broken one; and that Noah was really five hundred and twenty years old when God commanded him to build the ark. Others affirm, that of the hundred and twenty years, which God allowed them for repentance, he cut off twenty, that the deluge began at the end of an hundred inſtead of an hundred and twenty years, as had been appointed.

But theſe anſwers are mere conjectures, advanced without any ſolid proof; and therefore far from being ſufficient to deſtroy plain and expreſs texts; beſides, they reſolve but part of the difficulty: for it ſtill remains a queſtion, how Noah, between the age of five hundred, and five hundred and twenty years, could have his three ſons and marry them; ſo as God might ſay to him, "Thou ſhalt come into the ark, thou, and thy ſons, "and thy wife, and thy ſons wives with thee." It is very difficult to believe, that at this time, when men lived eight or nine hundred years, they ſhould be marriageable at ſeventeen or eighteen. Laſtly, it may be ſaid, that when Noah is declared to have begotten Shem, Ham, Japhet, at five hundred years of age, it ſhould be tranſlated, He had begotten, inſtead of, he begat.

There are likewiſe many commentators, who allow Noah only two and fifty years to build the ark; ſome no more than ſeven or eight years; and others ſtill much leſs. The Mahometans ſay he had but two years allowed him for this work.

As to the particular ſort of wood whereof the ark was built, the Hebrew imports, that it was gopher-wood; the Septuagint tranſlate this, ſquare pieces of wood; others ſay it was cedar, or box, or ſome other ſtrong wood. Bochart maintains, that gopher ſignifies cypreſs: and it ſhould be remembered that in Armenia and Aſſyria, where it is ſuppoſed, with reaſon, the ark was built, cypreſs is the only wood fit to make a long veſſel, ſuch as the ark was. Alexander the Great, deſigning to build a fleet, could find no wood proper for this uſe in Babylonia, but was forced to have cypreſs brought from Aſſyria. Others are of opinion, that the Hebrew gopher ſignifies, in general, oily and gummy woods, ſuch as the pine, the fir-tree, and the turpentine-tree. The word gophrit, which comes very near gopher, ſignifies ſulphur, and in a larger ſenſe may be taken for roſin, pitch, and other combuſtible matters drawn from wood. St. Jerom tranſlates it in this place, poliſhed wood; but in another he interprets the Hebrew, wood done over with bitumen, ligna bituminata. The paraphraſts Onkelos and Jonathan, and ſome others, have thought this wood to be cedar: and it muſt be owned, that it is a point which ſtill remains undecided; but if our opinion would be of any weight, we ſhould prefer that which ſuppoſes it to mean cypreſs.

But the greateſt difficulty relating to Noah's ark, regards its ſize and capacity; and how they were able to build a veſſel ſufficient to contain the men and beaſts, beſides the proviſions neceſſary for the ſupport of both, during the whole year. To remove theſe difficulties, it has been neceſſary to be very particular in enquiring into the length of the cubit mentioned by Moſes, into the number of the beaſts that were admitted into the ark, as well as into the dimenſions of this vaſt building; and after the niceſt examination, computations, and taking the dimenſions with the utmoſt geometrical accuracy, the moſt learned and able calculators conclude, that if the greateſt mathematicians had been conſulted, with regard to regulating the proportions of the ſeveral apartments in the ark, they could not have done it with more exactneſs than Moſes has done; and the narration in the ſacred hiſtory, in this particular, is ſo far from furniſhing deiſts with weapons to attack its authority, that, on the contrary, it ſupplies us with good arguments to confirm it: for it ſeems impoſſible for a man, in the times of Noah, when navigation was in its infancy, to diſcover, by his own wit and invention, ſuch an accuracy and regularity in proportion, as is remarkable in the different apartments of the ark, and the end for which they were deſigned. It therefore follows, that it muſt be owing to a ſuperior light, and the inſpiration of the Deity.

Ark *of the Covenant*, among the Jews, implies a ſmall cheſt made of beaten gold, wherein were contained the golden pot filled with manna, Aaron's rod, and the tables of the covenant.

ARM, *Brachium*, a part of the human body, terminating at one end in the ſhoulder, and at the other in the hand.

Anatomiſts divide the arm into two parts, calling only that part of the arm included between the ſhoulder and the elbow; the reſt they term the fore-arm. The arm in this acceptation has only one large bone, called the os humeri, or the ſhoulder bone. The other part conſiſts of two bones, termed the radius, and the cubitus, or ulna.

The os humeri has five ſorts of motions, which are effected by five pairs of muſcles; upwards by the deltoides, ſupraſpinatus, and coraco-brachialis; downwards by the rotundus major, and latiſſimus dorſi; forwards by the pectoralis; and backwards by the infraſpinatus.

The muſcles of the fore-arm are the biceps, brachiæus internus, gemellus, brachiæus externus, anconæus, pronator, radii teres et quadratus, ſupiſpinator longus et brevis. Its motions are confined to two kinds, that of rotation, and that of flexion and extenſion.

Arm, among ſportſmen, is applied to a horſe, when by preſſing down his head, he endeavours to defend himſelf againſt the bit, to prevent his being checked by it.

Arm, in geography, implies a branch of the ſea, running ſome diſtance into the land.

Arm *of a Magnet* is a ſmall piece of ſteel in the iron incloſure, in which the load-ſtone is placed. See Magnet.

ARMADILLO, in natural hiſtory, the name of an animal reſembling a hedge-hog, and almoſt of the ſame ſize. His head, body, and tail, are covered with a ſhield of a bony ſubſtance, and very curiouſly contrived with moſt beautiful ſcales. Near the hind part of the head are two joints, that he may move his head; and on the back ſeven diviſions, or ſhields, with a yellow ſkin between each. The feet are alſo covered with a thinner ſhield. The lower parts of his body are without this covering, but are beſet with hairs near an inch long, which proceed from prominent pores. There are alſo a few hairs on the ſkin, which joins to ſeveral ſhells of the ſhield, like the former; as alſo near the mouth and eyes.

The head is like a hog, with a ſharp ſnout: it has little eyes ſunk deep in the head, and a pointed narrow tongue. The ears are naked, brown, and ſhort; the teeth are of a middle ſize, and eighteen in each jaw. The feet reſemble hands, with five fingers, and roundiſh nails. He roots up the ground with his ſnout, like a hog; and is tinctured all over with a reddiſh colour. The tail at the root is near four inches thick; but grows leſs gradually to the end, which terminates in a point. He lives upon melons, potatoes, and other roots; and will eat fleſh when he can get it. He generally lies hid in the ground, and ſometimes will frequent water and watery places, where he feeds upon worms, ſmall fiſh, and water inſects. Sometimes he will eat ants, apples, and the berries of certain trees. See plate IV. *fig.* 6.

The armadillo of the Caribbee iſlands, is of the ſize of a pig of a month old, with a ſmall long head, little eyes, and a mouth well furniſhed with teeth, and the ears are likewiſe little; but the tail is long, and covered with bony rings or ſhells. The legs are ſhort and thick, and it has four claws on each foot, which are large and ſtrong. The whole body, from the neck to the tail, is covered with rows of ſhells; and the firſt and the laſt, namely, that which covers the ſhoulders and thighs, are much larger than thoſe on the reſt of the body. There are about twelve ſhells in all, which ſlide over each other like the joints of a coat of armour, by means of a ſkin like a griſtle, which unites them together. They are of a dirty grey colour, with a few little white ſpots.

This animal has a quick feeling, and will roll himſelf up like a ball, when his ſhells are a little preſſed. Beſides the above motion of the ſhells, they are alſo capable of ſtretching conſiderably; or rather, it is the membrane that ties them together, which has that faculty; and this renders the motion of the animal much more quick and eaſy than it otherwiſe would be. The ſkin under the belly is without hair, and ſeems to be very tender and delicate; it is likewiſe of a grey colour.

When he is afraid, he withdraws his head under his ſhell, and lets nothing be ſeen but the end of the ſnout. He then draws up his feet under his belly, and his tail under them; ſo that his ſhells entirely cover them; and the two extremities of this animal meeting together, he becomes as round as a ball, a little flattiſh on each ſide.

Hence it appears he may be very eaſily taken when he is rolled up in this manner; but he is not very willing to unfold himſelf; for the more he is in danger, the more he contracts his covering. The only way to make him open is to lay him near a fire; for as ſoon as he feels the heat he diſplays his limbs. He lives upon leaves, fruit, and roots, which he lays bare with his paws, and cuts with his teeth. He cannot run very faſt, much leſs climb up trees; and his lurking places are the ſtumps and bodies of trees which are hollow. The fleſh is white, fat, and delicate; but it is beſt when ſeaſoned with ſpices to quicken the taſte.

The African Armadillo is called by ſome the cataphractus; it has twelve ſhields and two girdles. It is only ten inches long, from the tip of the ſnout to the root of the tail; but the tail itſelf is ſeven inches long. There are five toes on each foot, armed with ſtrong claws, and the three in the middle of the fore-feet are the largeſt. The ears, which are pretty long, are roundiſh at the end; and between the two large ſhields are twelve narrow bands, joined together by a thick membraneous ſkin, and covered with ſcales in the ſhape of parallelograms. Thoſe that cover the great ſhield have ſometimes four, ſometimes five, and ſometimes ſix ſides; but they are always unequal. The weaſel-headed armadillo, or tatu, is ſo called from the ſhape of his head, which is like that of a weaſel. The body is eleven inches long and ſix broad; and the head three inches and a half, and the forehead two and a half, and very flat. The end of the ſnout is half an inch broad, and the eyes are little. The ears are two inches diſtant from each other, and an inch in length; and the tail is five inches and a half long. The fore-feet are two inches and a half in length, and three quarters of an inch in breadth. All the feet are divided into five toes; of which the three middlemoſt are two inches long, and they are all armed with claws one third of an inch long.

The head, back, ſides, and tail, are covered with a cruſtaceous ſhield; and the helmet and the cover of the feet conſiſt of roundiſh ſcales a quarter of an inch broad. The collar is a plate made up of ſquare bits a quarter of an inch broad, and the cover of the ſhoulder conſiſts of ſquare ſegments of various kinds. The armour on the back, as far as the tail, is compounded of ſeveral moveable plates, eighteen in number, connected together with as many membranes. The plates before are the largeſt, and conſiſt of ſquare ſegments, half an inch in length, and a quarter of one broad; but theſe behind are made up of thoſe that are round and ſquare, mixed together. The fore-part of the tail is compoſed of ſix rings; but the latter is covered with ſcales, and the breaſt, belly, and ears, are naked. *Brookes's Nat. Hiſt.*

ARMENICA, apricot, in botany. See Apricot.

ARMENIANS, in eccleſiaſtical hiſtory, a ſect, or diviſion, among the eaſtern chriſtians, ſo called from Armenia, the country they originally inhabited: there are two kinds of Armenians, the one catholic, and ſubject to the pope, having a patriarch in Perſia, and another in Poland; the other form a peculiar ſect, and have two patriarchs in Natolia. They are generally accuſed of being monophyſites, admitting only of one nature in Chriſt. With regard to the euchariſt, they, in general, agree with the Greeks; abſtain religiouſly from eating of blood and things ſtrangled; and are much addicted to faſting.

ARMILLA-Membrosa, in anatomy, is that circular ligament which comprehends all the tendons belonging to the whole hand within a circle, in the region of the carpus.

ARMILLARY, in a general ſenſe, implies ſomething compoſed of rings or circles.

The word is Latin, *armillaris*, and derived from *armilla*, a bracelet.

Armillary *Sphere*, an artificial ſphere compoſed of a number of circles of the mundane ſphere, put together in their natural order, to eaſe and aſſiſt the imagination, in conceiving the conſtitution of the heavens, and the motions of the celeſtial bodies. See pl. IV. *fig.* 11.

The armillary ſphere revolves upon its axis within a ſilvered horizon, which is divided into degrees, and moveable every way upon a braſs ſupporter. The other parts are the equinoctial, zodiac, meridian, the two tropics, and the two polar circles.

ARMINIANS, in eccleſiaſtical hiſtory, are a ſect of Chriſtians that aroſe in Holland, by a ſeparation from the Calviniſts.

They are great aſſertors of free-will; and ſpeak very ambiguouſly of the preſcience of God. They look on the doctrine of the Trinity as a point not neceſſary to ſalvation, and many of them hold that there is no precept in Scripture which enjoins us to adore the Holy Ghoſt; and that the Son is not equal to the Father.

ARMISTICE, in military affairs, a temporary truce, or ceſſation of arms for a very ſhort ſpace of time.

The word is Latin, *armiſtitium*, and compounded of *arma*, arms, and *ſto*, to ſtand, or ſtop.

ARMOSIN, a kind of ſilk ſtuff, manufactured in the Eaſt-Indies, at Lyons in France, and at Lucca in Italy.

ARMONIAC, or Ammoniac. See Sal *Ammoniacum*.

ARMORIAL, ſomething relating to arms, or coats of arms.

ARMORY, a magazine of arms, or a place where military habiliments are depoſited, that they may be ready for uſe.

Armory alſo implies a branch of the ſcience of heraldry, conſiſting in the knowledge of coats of arms, with regard to the blazonry and various intendments.

ARMOUR, all ſuch habiliments as ſerve to defend the body from wounds, eſpecially thoſe given by darts, ſwords, lances, &c.

ARMOURER, a perſon who makes or deals in arms or armour.

ARMS, *Arma*, in a general ſenſe, all kinds of weapons, whether offenſive or defenſive.

Arms, in a legal ſenſe, extend to any thing a perſon wears for his own defence, or takes in his hand, and uſes in anger, to ſtrike or throw at another.

Arms, or Armories, in heraldry, ſignify marks of honour borne upon ſhields, banners, and coats, in order to diſtinguiſh kingdoms, ſtates, families, and perſons.

Charged Arms are ſuch as retain their ancient integrity, with the addition of ſome new honourable bearing.

Canting or *Vocal* Arms, thoſe in which there are ſome figures, alluding to the name of the family.

Full or *Intire* Arms, ſuch as retain their primitive purity, without any alterations or abatements.

Falſe Arms, ſuch as are not conformable to the rules of heraldry.

Arms, in falconry, imply the legs of a hawk from the thigh to the foot.

ARMY, a large number of ſoldiers, conſiſting of horſe and foot, completely armed, and provided with artillery, ammunition, &c. under the command of one general, with proper officers under him.

An army is compoſed of ſquadrons and battalions, and is uſually divided into three corps, and formed into three lines. The firſt is called the van-guard, the ſecond the main body, and the third the rear-guard.

ARNOLDISTS, in eccleſiaſtical hiſtory, a ſect of ſeparatiſts, ſo called from their leader, Arnold of Breſſe, a great declaimer againſt the wealth and vices of the clergy. He is alſo charged with preaching againſt baptiſm and the euchariſt.

AROMATIC, an epithet applied to ſuch plants and other bodies as yield a fine fragrant ſmell, and have a warm ſpicy taſte.

AROPH, a term frequently uſed by Paracelſus for lithontriptic medicines.

AROURA, a Grecian long meaſure, containing fifty feet. It was alſo frequently uſed for a ſquare meaſure of half the plethron. The Egyptian aroura was the ſquare of a hundred cubits.

ARPENT, a term ſometimes uſed to denote an acre.

ARQUEBUSS. See Harquebuss.

ARRACHEE, in heraldry, a term applied to the repreſentation of plants torn up by the roots.

ARRAC. See Arac.

ARRAY, in law, implies the ranking or ſetting forth a jury or inqueſt of men impanelled on ſome cauſe.

Battle Array, the order or diſpoſition of an army drawn up with a view to engage the enemy.

ARREARS, the remainder of a ſum due, or money remaining in the hands of an accountant. It likewiſe ſignifies the money due for rent, wages, &c. or what remains unpaid of penſions, taxes, &c.

ARRENATION, in the foreſt laws, implies the licenſing the owner of lands in a foreſt, to incloſe them with a low hedge and a ſmall ditch, in conſideration of a yearly rent.

ARREST, the apprehending and ſeizing a perſon, in order to oblige him to be obedient to the law; which in all caſes, except treaſon, felony, or breach of the peace, muſt be done by virtue of a precept out of ſome court. See Writ.

Arrest *of Judgment*, the aſſigning juſt reaſon why judgment ſhould not paſs, as want of notice of the trial, a material defect in the pleading, when the record differs from the deed impleaded, when perſons are miſ-named, where more is given by the verdict than is laid in the declaration, &c. This may be done either in criminal or civil caſes.

ARRESTS, in farriery, mangy tumours between the ham and the paſtern of a horſe's hind legs. See Rat-tails.

ARRHEPHORIA, a feſtival among the Athenians, in honour of Minerva. The miniſters who aſſiſted at it were boys and girls, between ſeven and twelve years of age.

The word is Greek, and compounded of *αρρητα*, myſtery, and *φερω*, to carry.

This feaſt was alſo called Herſiphori, from Herſe, the daughter of Cecrops, on whoſe account it was inſtituted.

ARRIERE, the hinder or poſterior part of any thing. See Rear.

ARRONDEE, in heraldry, implies a croſs, the arms of which are compoſed of ſections of a circle.

ARROW, a miſſive weapon, ſharp pointed and barbed, deſigned to be ſhot from a bow. See Bow.

Arrow, among ſurveyors, implies a ſmall ſtick generally ſhod with iron, to ſtick into the ground at the end of the chain.

ARSCHIN, in commerce, a long meaſure uſed in China to meaſure ſtuffs. Four arſchins make three Engliſh yards.

ARSENIC, a poiſonous mineral ſubſtance, frequently found mixed with other matters.

The chemiſts have formed various conjectures about the nature of this ſingular concrete; but have not been able to determine what it really is, or to what claſs of bodies it belongs. They have called it ſulphureous, unctuous, mercurial, a mineral juice, &c. without foundation. Boerhaave, in his "Elementa Chemiæ," ranks it under the head of ſulphurs, and ſays it approaches nearer to the nature of ſulphur than of any other known mixt body: it wants, however, the peculiar qualities by which ſulphur is diſtinguiſhed. Stahl, with greater probability, ſuppoſes it to be of a ſaline nature. In ſome of its ſtates, it apparently poſſeſſes properties attributed to ſalts alone; but in other ſtates, it is as obviouſly metallic.

White arſenic, or arſenic ſtrictly ſo called, is a moderately heavy, compact, hard, brittle concrete; of a cryſtalline or vitrious appearance, gradually changing, from expoſure to the air, to a milky hue like that of porcelain, and at length to the opake whiteneſs of white enamal. The larger maſſes preſerve their tranſparency longer than the ſmall; in a dry longer than in a moiſt air.

In the fire, it neither burns, nor perfectly melts; but totally and readily exhales in thick fumes, of a ſtrong fetid ſmell reſembling that of garlic. The fumes, caught in proper veſſels, condenſe, either into cryſtalline maſſes again, or into a white powder, according as the receiver is leſs or more removed from the heat.

Mixed with inflammable matters, and expoſed to the fire in a retort or other like veſſel, it aſſumes a metallic appearance. In this ſtate, it greatly reſembles regulus of antimony; being, like that ſemimetal, of a bright ſparkling whitiſh colour, a plated or leafy texture, and very brittle: but its whiteneſs ſoon changes in the air to a dark blackiſh hue. It ſtill continues volatile, as in its unmetallic form: it burns and calcines in the fire, and ſublimes into white arſenic, as at firſt.

Arſenic reduced into fine powder, and boiled in fifteen times its weight of water, totally diſſolves. If the ſolution be evaporated a little, the arſenic ſhoots, on cooling, into cryſtals, which frequently have a yellowiſh tinge. The entire cryſtals are not taken up again by boiling water; but when finely pulverized, they diſſolve as at firſt. The ſolution has a nauſeous taſte, but not a ſaline ſharpneſs.

Arſenic diſſolves both in acid and in alkaline liquors, but makes no efferveſcence with either: in fixed alkaline lixivia it diſſolves very plentifully; in acids, more ſparingly. Arſenic in its ſemimetallic form, called regulus, is eaſier of ſolution than the white arſenic or calx.

Arſenic is employed for ſundry mechanic uſes; by the dyers, as an ingredient in the compoſitions of ſcarlet and other fine reds; by the girdlers and pinmakers, for whitening their braſs or copper; by the goldſmiths, for enamelling; by the glaſs-makers, for promoting the fuſion of the fritt, and the clearneſs and tranſparency of the glaſs; by the porcelane-makers, in white glazings; by the preparers of compound metals, for communicating a ſilver whiteneſs to copper; by the aſſayers, it is uſed, in the form of glaſs, for promoting the ſcorification of refractory ores, which participate of tin and antimony, and which will not work off, but run into lumps in the cupel. A certain artiſt at Berlin prepares a beautiful metal, like the fineſt ſteel, by melting caſt iron with arſenic and glaſs, and adding a little tin during the fuſion: the beauty of the metal depends in a great meaſure upon the proportions. In Vienna, a metal is made for ornamental uſes, reſembling the fineſt ſilver, from iron, tin, and arſenic; perhaps with the addition of a little copper. Arſenic is uſed alſo in ſolders, or for uniting iron with tin, in ſome places in the making of tinned iron plates.

Arſenic is a moſt violent poiſon to all animals; unleſs the wolf ſhould be an exception, who is ſaid, probably without ſufficient foundation, to be only purged by it. The utmoſt caution is therefore neceſſary, in all operations upon arſenic, to avoid its fumes: it is on account of the danger attending ſuch operations that this mineral has hitherto been ſo little examined by the chemiſts. The deſtroying of rats, or other domeſtic animals, by means of arſenic, is full of danger; the operation of the poiſon being ſuch, that great part of it is diſcharged, and the animal induced to drink: hence foods, liquors, and the provender of cattle, have too often received a poiſonous taint. If we cannot catch thoſe animals, we may nevertheleſs be cleared from them by much ſafer means than the uſe of arſenic: freſh night-ſhade is their enemy. If the juice of the leaves or berries of that plant, or the diſtilled water of the freſh herb, be made into pellets with meal, the rats, without taſting the pellets, will forſake the places where they are laid.

With regard to the effects of arſenic in the human body; a nauſea, ſickneſs, and reaching commonly enſue in about half an hour after taking it; followed by violent vomitings, hiccups, and pains in the ſtomach and bowels: convulſions and palſies of the limbs preſently ſucceed, with intenſe heats, cold ſweats, palpitations of the heart, extreme anxiety, reſtleſſneſs, proſtration of ſtrength, thirſt and dryneſs of the mouth and throat, loſs of reaſon, and at laſt death. If the quantity taken has been conſiderable, the ſtomach and inteſtines are often found, upon diſſection, corroded or perforated; though in general the patient expires before the action of the poiſon has proceeded to ſuch a length. There are many poiſons which act by coagulating the juices; but the operation of arſenic is erroneouſly ſuppoſed to be of this kind: arſenic rather liquifies than coagulates the blood, and makes no change in its colour: of milk, ſaliva, and other animal juices, it rather prevents than promotes the coagulation. It is better to acknowledge our ignorance than to advance groundleſs conjectures.

Several ſubſtances have been propoſed as antidotes to this poiſon. Thoſe who imagine arſenic to be an alkali, recommend acids; and thoſe who imagine it a corroſive acid, direct alkalies for counteracting its effects: but arſenic is apparently neither one or the other. If rock cryſtal, or bezoar, or the roots of the elder tree, by ſome ſtrongly recommended, have ſeemed to do ſervice where arſenic had been taken; it was not on thoſe ingredients, but on the oils or fats uſed along with them, that the good effects of the medicine depended. Oils, fats, warm fat broths, freſh butter, milk, taken plentifully and repeatedly, are the only antidotes; both for obtunding the force of the arſenic, and promoting its diſcharge by vomit. If the vomiting does not freely ſucceed by the liberal uſe of theſe kinds of ſubſtances, ſome mild emetic muſt be added; the expulſion of the poiſon being a principal point. The more threatening ſymptoms being thus removed, oily clyſters, and a gentle laxative, are neceſſary, to obtund and evacuate ſuch part of the arſenic as may have paſſed into the inteſtines; after which, the ſtrength is to be recruited by proper analeptics.

Caſes frequently happen in which we are called upon to determine whether a particular ſubſtance be arſenic or not; as when powdery matters are found in the ſtomach of thoſe who are ſuſpected to have died by poiſon. Arſenic, in a ſolid form, may be diſtinguiſhed by its yielding, in the fire, white fumes, and a garlic ſmell; and by its whitening copper. This laſt trial is moſt commodiouſly made, by placing a little of the powder betwixt two clean poliſhed copper-plates, binding the plates firmly together with wire, cloſing the juncture all round with a good lute, and then heating them red-hot. We may try alſo whether any reguline or ſemimetallic matter is obtainable, by means of tartar and ſuet.

The principal preparations of arſenic are, fixed arſenic, and the arſenical magnet. Fixed arſenic is made by gradually injecting powdered arſenic into melted nitre, commonly in the proportion of one part of the former to two of the latter. When the ebullition is over, the crucible is covered, the matter kept melted for a little time with a ſtrong fire, and afterwards edulcorated with water. The arſenical magnet is a mixture of equal parts of pure white arſenic, ſulphur, and antimony, reduced ſeparately into fine powder, then mixed, put into a glaſs body ſet in ſand in a crucible, and urged with a very gradual fire, till the matter is melted into a red vitreous maſs reſembling a deep garnet or ruby. We muſt be cautious in handling this arſenical glaſs, as a wound received from it may be dangerous.

Pure cryſtalline white arſenic is never found native in the earth. A powdery white arſenic is now and then met with in ſome of the Bohemian and Saxon mines; though even this ſeems to be not a natural arſenic, but to have been ſeparated and ſublimed from the ores, by the wood fires made in the mines for burſting the maſſes of ore. It is obſervable, that Saxony, of all countries in the word, is the richeſt in arſenical ores; and that the richeſt ſilver-ores abound with arſenic. *Neumann's Chemiſtry.*

ARSIS and Thesis, in muſic, is a term applied to compoſitions, in which one part riſes and the other falls.

ARSMART, in botany, the name of ſeveral ſpecies of perſicaria. See Persicaria.

ART, *Ars*, a ſyſtem of rules ſerving to facilitate the performance of certain actions; in which ſenſe it ſtands oppoſed to ſcience, or a ſyſtem of ſpeculative principles.

Arts are commonly divided into liberal and mechanical; the former comprehending poetry, painting, ſculpture, architecture, &c. and the latter, the whole body of mechanical trades, as carpentry, maſonry, turnery, &c.

Art and Part, in the law of Scotland, is applied to an accomplice.

ARTEMESIA, mugwort, in botany, the name of a plant, whoſe ſtalks are firm, and generally of a purpliſh colour: the leaves are deeply divided, reſembling thoſe of common wormwood, of a dark green colour above, and hoary underneath: the flowers, which are ſmall, naked, and diſcous, ſtand erect in ſpikes on the tops of the branches. It is perennial, grows wild in the fields and waſte grounds, and flowers in June.

This plant has been chiefly recommended for promoting the uterine evacuations, and abating hyſteric ſpaſms; for which purpoſe infuſions of it have been drank as tea, and uſed as a bath. It appears to be one of the mildeſt of the ſubſtances made uſe of in ſuch intentions; and may perhaps be of ſervice in ſome caſes, where medicines of more activity would be improper.

ARTERIAL, in anatomy, any thing belonging to, or that performs the office of, an artery.

Arterial *Vein*, in anatomy, a name given to the pulmonary artery.

ARTERIOTOMY, the opening an artery in order to procure an evacuation of blood.

The word is Greek, *αρτηριοτομια*, and compounded of *αρτηρια*, an artery, and *τεμνω*, to cut.

ARTERY, in anatomy, a conical tube or canal, which conveys the blood from the heart to all parts of the body.

An artery is compoſed of three membranes or coats; the outermoſt of which appears to be a web of fine blood veſſels and nerves, for conveying nouriſhment to the interior membranes. The next is compoſed of circular or ſpiral fibres, of which there are more or fewer, according to the magnitude of the artery. Theſe fibres, being very elaſtic, contract themſelves with ſome force, when the power ceaſes by which they have been extended. The third and innermoſt membrane is of a denſe contexture, yet fine and tranſparent. It ſerves to keep the blood within its channels, which otherwiſe would, upon the dilatation of the artery, ſeparate the ſpiral fibres from one another. The pulſe of the arteries conſiſts of two reciprocal motions, like the pulſe of the heart, being a ſyſtole and a diaſtole, keeping oppoſite times; the ſyſtole of the one anſwering to the diaſtole of the other.

The arteries of the human body are, ſtrictly ſpeaking, only two, namely, the aorta, and the pulmonary artery; all the other arteries, tho' diſtinguiſhed by proper names, being only branches of theſe two.

The aſcending aorta, which ariſes immediately from the left ventricle of the heart, preſently after gives two arteries, called coronary ones, to the heart itſelf. A little above this it is divided into three aſcending branches, from which are formed the two carotids, and the two ſubclavians; and from theſe laſt proceed the muſcularis colli, the external ſcapulary artery, the ſuperior intercoſtals, the mediaſtinal artery, the ſuperior diaphagmatic artery, the mammary artery, and the axillary arteries: all which are ſubdivided into leſſer branches.

From the deſcending trunk of the aorta, proceed in the following order; the bronchial artery, the inferior intercoſtals, the arteries of the œſophagus, the interior diaphragmatics, the cœliac, ſuperior meſenteric, the renal or emulgent arteries, the ſacra, and two iliacs. Theſe are the main branches ſent out from the deſcending aorta, each of which is again ſubdivided into many leſſer branches.

But *fig.* 1. plate VI. which is taken from Drake's Anatomy, will give a much better idea of the arteries of the human body, than is poſſible to be conveyed by words.

1. The aorta cut from its origin at the left ventricle of the heart. *Fig.* 3. of the ſame plate, repreſents part of the trunk of the aorta turned inſide out; *a*, *a*, the internal, or nervous coat; *b*, *b*, the muſcular coat; *c*, the external, or vaſcular coat.

A. The three ſemi-lunar valves of the aorta, as they appear when they hinder the blood from coming back into the left ventricle of the heart, in its diaſtole.

2, 2. The trunk of the coronary arteries ariſing from the aorta.

3. Ligamentum arterioſum.

4, 4. The ſubclavian arteries.

5, 5. The two carotid arteries.

6, 6. The two vertebral arteries, which ariſe from the ſubclavicula, and paſs through all the tranſverſe proceſſes of the vertebræ of the neck.

7, 7. The arteries which convey blood to the lower part of the face, tongue, adjacent muſcles and glands.

8, 8. The trunks of the temporal arteries ſpringing from the cerotids, and giving branches to the parotid glands.

9, 9. Branches of the temporal arteries, conveying blood to the neighbouring muſcles, the hairy ſcalp, and forehead.

10, 10. The trunks which ſend blood to the foramina narium, particularly to the glands of its mucous membrane.

11, 11. The occipital arteries, whoſe trunks paſs cloſe by the mammiform proceſs.

12, 12. Muſcles which carry blood to the fauces, gargareon, and muſcles of thoſe parts.

B, B. Small portions of the baſis of the ſkull, perforated by the artery of the dura mater, part of which *is* repreſented as hanging to the arteries.

13, 13. The contortions of the carotid arteries, before they paſs the baſis of the ſkull to the brain.

14, 14. Theſe parts of the carotid arteries, where they paſs by each ſide of the ſella turcica, where ſeveral ſmall branches ariſe from them, and help to compoſe the rete mirabile.

C. The glandula pituiaria, taken out of the ſella turcica, lying between the two contorted trunks of the carotid arteries, marked 14, 14.

D, D. The arteriæ ophthalmicæ, which ſpring from the carotids before they enter the pia mater.

15. The contortions of the vertebral arteries, as they paſs the tranſverſe proceſſes of the firſt vertebræ of the neck, towards the os occipitis.

16. The two trunks of the vertebral arteries that lie on the medulla oblongata.

17. The communicant branches between the carotid and cervical artery.

18, 18. The ramifications of the arteries within the ſkull, the larger trunks of which lie between the lobes of the brain, and its ſulci.

E, E. The arteries of the cerebellum.

19, 19. The arteries of the larynx; thyroid glands, and

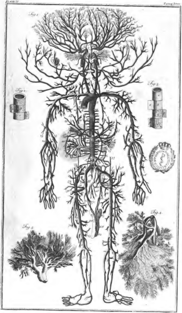


Fig. 1
Fig. 2
Fig. 3
Fig. 4
Fig. 5

and adjacent muſcles and parts ariſing from the ſubclavian arteries.

20, 20. Others ariſing near the former, which convey blood to the muſcles of the neck and ſcapula.

21, 21. The mammariæ, which ariſe from the ſubclavian arteries, and deſcend on the cartilages of the true ribs internally, on each ſide the os pectoris or ſternum. Some branches of theſe paſs through the pectoral as well as intercoſtal muſcles, and give blood to the breaſts, where they meet ſome branches of the intercoſtal arteries.

22, 22. The arteries of the muſcles of the os humeri, and ſome of thoſe of the ſcapula.

23, 23. Thoſe parts of the large trunks of the arteries of the arm, which are liable to be wounded in opening the vena baſilica, or innermoſt of the three veins in the bending of the cubit.

25, 25. A communicant branch of an artery ariſing from the trunk of the artery of the arm, above its flexure at the cubit, which is inoſculated with the arteries below the cubit.

26, 26. The external artery of the cubit, which makes the pulſe near the carpus.

27, 27. Arteries of the hands and fingers.

28, 28. The deſcending trunk of the arteria magna.

29. The bronchial artery, ſpringing from one of the intercoſtal arteries: it ſometimes ariſes immediately from the deſcending trunk of the aorta; and at other times from the ſuperior intercoſtal artery which ſprings from the ſubclavian.

30. A ſmall artery, ſpringing from the fore parts of the aorta deſcendens, and paſſing to the gula.

31, 31. The intercoſtal arteries on each ſide the arteria magna deſcendens.

32. The trunk of the arteria cæliaca, whence ſpring,

33, 33. The hepatic arteries, and

34. The arteria cyſtica, or the gall-bladder.

35. Arteria coronaria ventriculi inferior.

36. The pylorica.

37. The epiploica dextra, ſiniſtra, and media, ſpringing from the coronaria.

38. The ramifications of the coronary artery, which embrace the bottom of the ſtomach.

39. Coronaria ventriculi ſuperior.

40, 40. The phrenic arteries, or the two arteries of the diaphragm; that on the left ſide ariſing from the trunk of the anteria magna; the right ſpringing from the cæliaca.

41. The trunk of the ſplenic artery, ariſing from the cæliaca, contorted.

42. Two ſmall arteries going to the upper part of the duodenum and pancreas; the reſt of the arteries of the pancreas ſpring from the ſplenic artery in its paſſage to the ſpleen.

43. The trunk of the arteria meſenterica ſuperior turned towards the right ſide.

44. The branches of the ſuperior meſenteric artery, freed from the ſmall guts. Here the various anaſtomoſes the branches of this artery make in the meſentery, before they arrive at the inteſtines, may be obſerved.

45. The inferior meſenteric artery ariſing from the arteria magna.

46. Remarkable anaſtomoſes of the meſentric artery with the ſuperior.

47, 47. The branches of the inferior meſenteric artery, as they paſs to the inteſtinum colon.

48. Thoſe of the rectum.

49. The emulgent arteries of the kidneys.

50. The vertebral arteries of the loins.

51, 51. The ſpermatic arteries, which deſcend to the teſtes, and are ſo ſmall as to eſcape being filled with wax.

52. Arteria ſacra.

53. Arteriæ iliaci.

54, 54. Rami iliaci externi.

55, 55. Iliaci interni.

56, 56. The two umbilical arteries cut off; that on the right ſide is drawn as in the fœtus, and the left expreſſed as in an adult.

57, 57. The epigaſtric arteries, which aſcend under the right muſcles of the abdomen, and are inoſculated with the mammariæ.

58, 58. Branches of the external iliac arteries, paſſing between the two oblique muſcles of the abdomen.

59, 59. Branches of the internal iliac arteries, which convey the blood to the extenſores and obturatores muſcles of the thighs.

60, 60. The trunks of the arteries which paſs to the penis.

61, 61. The arteries of the bladder.

62, 62. The internal arteries of the pudendum, which, with thoſe here expreſſed with the penis, make the hypogaſtric arteries in women.

63. The penis extended with wax, and dried.

64. The glans penis.

65. The upper part of the dorſum penis, cut from the body of the penis, and raiſed, to ſhew the corpora cavernoſa penis.

66. Corpora cavernoſa penis, freed from the oſſa pubis, and tied after inflation.

67. The two arteries of the penis, as they appear injected with wax.

68. The capſula and ſeptum of the corpora cavernoſa penis.

69. The crural arteries.

70, 70. The arteries which paſs to the muſcles of the thighs and tibiæ.

71. That part of the crural artery that paſſes the ham.

72. The three large trunks of the arteries of the legs.

73. The arteries of the foot, with their communicating branch, from their ſuperior to their inferior trunk, as well as their communications at the extremity of each toe, like thoſe of the fingers.

Rough ARTERY, or aſperia arteria. See ASPERIA ARTERIA.

ARTHANITA, ſowbread, in botany, a low plant, without any other ſtalk than the ſlender pedicles of the leaves and flowers: the leaves are pretty large, round, of a green colour, above with white ſpecks, and purpliſh underneath: the flowers purpliſh, monopetalous, deeply divided into five ſegments, followed by round ſeed veſſels: the roots large, ſomewhat globular, with ſeveral fibres, blackiſh on the outſide, and white within. It is perennial, a native of the ſouthern parts of Europe, and cultivated in ſome of our gardens.

The freſh roots of arthanita have a nauſeous, acrid, biting taſte, and no remarkable ſmell: by drying, their acrimony is greatly abated, by long keeping, it is almoſt deſtroyed; though after they have loſt ſo much as to make very little impreſſion on the organs of taſte, they ſtill betray, when taken internally, a great degree of irritating power. Dried and powdered, they have been given in doſes of a dram, and found to operate as a ſtrong, inflammatory, yet ſlow cathartic. The juices is ſaid to purge ſtrongly when applied externally to the belly; and the juice or bruiſed root to be of great efficacy for ſoftening and diſcuſſing indolent and ſcrophulous tumours. The flowers are of a different nature, having a moderately ſtrong and very pleaſant ſmell, and little other than a mucilaginous taſte: they have been uſed medicinally, and the uſe of the roots is now, among us, in great meaſure laid aſide. *Lewis's Hiſtory of the Materia Medica.*

ARTHRITIS, in medicine, a diſeaſe, well known by the appellation of the gout. See the article GOUT.

The word is Greek, and derived from *αρθρον*, a joint; becauſe the chief ſeat of that diſtemper is in the joints.

ARTHRODIA, in anatomy, a ſpecies of articulation, wherein the flat head of one bone is received into a ſhallow ſocket in the other. The humerus and ſcapula are joined by this ſpecies of articulation.

The word is Greek, and compounded of *αρθρον*, a joint, and *δεχομαι*, to receive.

ARTHRODIUM, in natural hiſtory, a genus of imperfect cryſtals, always found in complex maſſes, and forming long ſingle pyramids, with very ſhort and ſlender columns. See CRYSTAL.

ARTICHOKE, *Cynara*, in botany, a well-known plant, cultivated in gardens. It requires a rich, deep, and moiſt ſoil, thoroughly dug ſeveral times over, and mixed with plenty of well rotted dung, to the depth of at leaſt three feet; for the deeper the mould is, the leſs watering they will require in the ſummer, and the larger and better flavoured their fruit will be in autumn. They may be raiſed from ſeeds: but the uſual and moſt expeditious way of propagating them is by ſlips, or ſuckers, taken from the old roots in February or March, or as ſoon as the hard froſts are over. Theſe ſuckers ſhould be taken off with ſome fibres to them; and if they are planted in a well prepared ſoil, like the abovementioned, they will yield the next autumn.

The time for taking off theſe ſuckers is alſo the proper ſeaſon for dreſſing the old ſtocks; which is performed thus: After all the earth has been removed from about the ſtock, down to below the part from which the young ſhoots are produced, two, or at moſt three, of the cleareſt, ſtraighteſt, and moſt promiſing of theſe ſhoots, iſſuing from the under part of the ſtock, are choſen for a crop. Theſe are far preferable to the ſtrong thick ſhoots that generally ſpring up from the crown of the roots, with woody ſtems, which never produce good or regularly ſcaled fruit. The gardener then (having previouſly taken off the ſuckers intended for planting elſewhere, in doing of which care muſt be taken not to injure the plants intended to remain) forces off, with his thumb, all the other buds and young ſhoots, cloſe up to the head of the ſtock; ſeparates the young plants that are left, as far aſunder as he can, without breaking them; draws the earth up to them with a ſpade; preſſes it down cloſe around them with his hands; and then pulls off the tops of the leaves which hang down.

Some, when they give this dreſſing, dig their ground all over, and are well rewarded for their pains by the extraordinary fineneſs of their fruit.

When this is done, and the ground laid level, a crop of ſpinage may be ſowed between the ſtocks; for it will be gathered before the artichokes can cover the ground.

Toward the end of April, or beginning of May, when the plants begin to fruit, all the young ſhoots, produced from their roots or ſtems ſince the dreſſing, muſt be pulled up or cut off, ſo as to leave only the principal head, which will by that means bear a fine large fruit. When the artichokes are fit to gather, their ſtems muſt be cut down cloſe to the ground, in order that the ſtocks may make ſtrong freſh ſhoots before the end of October, which is the uſual ſeaſon for earthing them up, or, as the gardeners term it, landing them: though this may be deferred till any time in December, if the weather proves mild.

This earthing of them conſiſts in cutting off all the young ſhoots quite cloſe to the ground, then digging a trench between each row, and covering the ſtocks with the earth thrown up, in ſuch manner, that they may be, as nearly as poſſible, under the middle of the ridge. This will ſecure them from any common froſt, and is infinitely better than the uſual practice of covering them with long dung, which never fails to render their fruit ſmall and very thin bottomed; for nothing is more prejudicial to this plant, than the burying of new dung near its roots, or laying it about them; ſo great is the danger of its making them rot, and of its harbouring vermin, which will deſtroy them. If, indeed, hard froſts are apprehended, a quantity of long dung, peas haulm, tanner's bark, or any other light covering, may be laid over the ridges; becauſe it will there be at ſuch a diſtance as not to injure the roots. This covering ſhould not be laid on till there is no avoiding it; and it ſhould be carefully taken off as ſoon as the weather is mild; for the plants will certainly be injured if it lies too long upon them.

The plants, thus earthed up, will not require any farther care before the end of February, or beginning of March, by which time they will have grown through the ridge of mould; and this, if the weather be proper, is the ſeaſon for dreſſing their roots as before directed.

Though the ſtocks of artichokes will laſt ten, or even fifteen years, in a rich and deep ſoil; yet, as they are great impoveriſhers of the ground, their fruit will dwindle, ſo as to render it moſt adviſeable to renew the whole plantation every fourth or fifth year, or, perhaps, rather every ſecond or third: to this end, the ground being prepared, and proviſion made of a ſufficient number of ſuckers choſen in the manner before directed; that is to ſay, clear, ſound, furniſhed with fibres, and not woody; the gardener ſhould pare off the knotted part which joined to the ſtalk. If it cuts criſp and tender, the ſucker is good; but if it be tough and ſtringy, the ſhoot is not worth planting. Having thus ſingled out thoſe that are fitteſt for his purpoſe, he ſhould cut off their large outſide leaves pretty low, in ſuch manner that the middle, or heart leaves, may riſe above them. After this, if the weather be very dry, or the plants have been long taken from the ſtocks, it will be right to ſet their root ends, at leaſt, in a tub of water, for three or four hours, to refreſh them before they are planted. The beſt method of planting them is in rows as ſtraight as poſſible, and at the diſtance of two feet from each other in the row. If there be more rows than one, as generally is the caſe where a full crop is wanted; theſe ſhould be five feet aſunder, and the plants ſhould be ſet quincunx faſhion. They ſhould be planted about four inches deep, the earth ſhould be cloſed very faſt to their roots, and, if the ſeaſon proves dry, they ſhould be watered twice or thrice a week, till they have taken good root. In a favourable ſeaſon, or on a moiſt ſoil, theſe plants will produce the largeſt and beſt artichokes in Auguſt and September, after all the old ſtocks have ceaſed to bear; ſo that a doubly long continuance of this fruit may be had, by making a new plantation every year.

A thin crop of ſpinage may be ſown upon this ground before the plants are ſet; but none of it muſt be ſuffered to grow very near them.

If any of the artichokes, thus planted in the ſpring, ſhould not produce fruit in the autumn, they may be made to yield it in the winter, or early the next ſpring, by tying up their leaves at the time of earthing up their roots, heaping up mould around till only their tops are ſeen, and then covering thoſe tops with a little ſtraw, or peas haulm, to defend them from froſt.

The kitchen gardeners near London, who endeavour to make the moſt of every inch of their high-rated land, generally plant their rows of artichokes nine or ten feet aſunder; and, beſides ſowing between them radiſhes or ſpinage, they plant two rows of cauliflowers, at the diſtance of two feet and an half from each other in the rows, and of four feet from row to row; ſo that full five feet are allowed for the artichokes. In May, when the crop of radiſhes or ſpinage is taken off, they ſow along the middle of the ſpace between the two rows of cauliflowers, a row of cucumbers, for pickling, at the diſtance of every three feet; and between the cauliflowers and the artichokes they plant, for winter uſe, a row of cabbages or ſavoys, which have room enough to grow after the cauliflowers and artichokes are taken off. Thus the ground is fully cropped during the whole ſeaſon.

If the artichoke ſtocks ſhoot but weakly in the ſpring, as they will do if they have been hurt by froſt or too much wet; the beſt way is to uncover them with a ſpade, to looſen and break the mould around them, or rather to dig the whole ground, if it be not planted with any thing elſe, and then to earth up a little the plants of each ſtock. In three weeks or a month's time after this, the ſlips will be fit to take off.

A moiſt rich ſoil always yields the largeſt and beſt artichokes; but if it be very moiſt, the roots will not live through the winter. Such ground ſhould therefore be allotted for freſh plantations made every ſpring, to ſupply the table in autumn, after the old ſtocks have done bearing: and for early fruit, the plants ſhould be in a drier ſituation. It ſhould alſo be open, and at a diſtance from the dripping of trees; for they would draw the plants up in height, and thereby render their fruit poor and ſmall.

The two ſorts of artichokes, commonly cultivated in this country, are the globe and the French. The former, which has by far the moſt fleſhy leaves, the thickeſt bottom, and the beſt taſte, is deſervedly preferred. It is alſo the largeſt. The ſcales of this ſort are brown, and turn inward. The French artichoke is more conical, its ſcales are narrower, of a greener colour, and frequently turned outward, and it has a diſagreeable perfumed flavour.

The bottoms of artichokes are good for many culinary uſes. The way to preſerve them all the winter is, to ſeparate them from the leaves, parboil them, and hang them up in a dry place, ſtrung on packthread, with a clean piece of paper between every bottom, to prevent their touching one another. They are likewiſe ſaid to be very good pickled.

M. de Chateauvieux has raiſed moſt excellent artichokes in the open field, without dunging the ground at all, or even watering the plants; but ſolely by a judicious execution of the principles of the new huſbandry: ſo great are the benefits which accrue from a thorough ſtirring of the earth! Artichokes which he planted at the end of May, produced in September their firſt fruits, which were, in general, from twelve to fifteen inches in circumference. Their leaves covered entirely beds ſix feet wide, in which they were planted.

This renders it highly probable, that if artichokes were always planted in ſingle rows, and in beds, by which means the ground between them may be the more eaſily and more frequently ſtirred, they would thrive better than in the common way of ſetting them in quincunx, or any other form, in ground laid out in one continued flat. The gardeners about great cities will not be brought into this method, nor indeed can they well afford it, becauſe they would hereby loſe ſome of their crops. Yet even here, though laſting plants will not be proper among the artichokes, many others which ſtand but a ſhort time, ſuch as young ſalleting, ſpinage, &c. may be cultivated with propriety. *Mills's Huſbandry.*

Jeruſalem ARTICHOKE, the root of a ſpecies of the ſun-flower of the perennial kind, and propagated in ſome gardens for the uſe of the kitchen. It is a very agreeably taſted root, but watry and windy, and therefore at preſent generally diſregarded.

It is propagated by planting out the ſmall roots, or even pieces of the larger, which have buds to them in the ſpring or autumn. They muſt be allowed a very conſiderable diſtance, for they ſpread immoderately, and multiply very quick.

The autumn following, when their ſtems decay, the roots may be taken up for uſe. It is an unſightly plant, though very tall, and therefore placed in the obſcure corners of a garden. *Miller's Gard. Dict.*

ARTICLE, a ſmall part of a book, writing, account, treaty, or the like.

ARTICLE, in anatomy, implies the juncture of two bones deſigned for motion.

ARTICLE, in arithmetic, denotes any number that can be divided into ten equal parts, as 10, 20, 30, &c.

ARTICLE, in grammar, implies a particle uſed in moſt languages for expreſſing the ſeveral caſes and genders of nouns, where different terminations are wanting to ſupply that office.

The Latins have no article; but the Greeks have their ὁ; the eaſtern nations their emphatical *he*; and moſt of the modern languages have recourſe to articles for fixing and aſcertaining the vague ſignification of common and appellative names.

The Engliſh have only two articles *a*, or *an*, when the ſubſtantive begins with a vowel, and *the*, which, being prefixed to ſubſtantives, apply their general ſignification to ſome particular thing. Thus we ſay, *a man*, or *the man*; the former confining the general word *man*, to ſome man or other, and the latter to a particular man.

Hence *a* is called an indefinite, and *the*, a definite article; becauſe the former is applied to nouns, taken in a more general and diffuſed ſignification; whereas the latter confines the word to ſome particular object. Thus, if we ſay, It is a happineſs to be a king, the expreſſion is vague, becauſe the word *king* may be underſtood of any king in general: but if we place *the* before the word *king*, inſtead of *a*, the noun *king* will be confined to the monarch of ſome particular people mentioned before.

Articles therefore are of the utmoſt uſe in a language, as by their aſſiſtance general appellations are rendered particular. We are ſurrounded with ſuch an amazing multiplicity of objects, that it would be impoſſible to give each a proper name, and conſequently general terms became neceſſary. But general terms could never anſwer the intention of conveying our ideas to each other by words or writing, unleſs we had ſome method of confining thoſe general terms to particular objects. This is the office of the article; and this it fully performs.

In this particular the Latin labours under a very great diſadvantage. Thus, when the devil ſaid to our Saviour, *Si tu es filius Dei*, it may be rendered *If thou art a Son of God*, or, *If thou art* the *Son of God*; and conſequently the ſenſe is ambiguous.

Grammarians are not agreed with regard to the grammatical appellation proper to be given to the article; ſome will have it to be a pronoun, ſome a noun adjective, and others a diſtinct part of ſpeech; but this is a frivolous diſpute, and has no relation to the uſe of the article.

ARTICLE *of Death*, *articulus mortis*, the laſt pangs, or agony of a dying perſon.

ARTICLE *of Faith*, a point of religious doctrine, allowed and received by ſome church or religious ſect, as having been revealed from heaven.

ARTICLES *of the Clergy*, certain ſtatutes relating to eccleſiaſtical perſons and cauſes, made in the reigns of Edward the ſecond and third.

ARTICLES *of Religion*, the thirty-nine heads of the proteſtant faith, drawn up by the biſhops Cranmer and Ridley, and publiſhed by regal authority in the reign of Edward the Sixth.

ARTICULARIS MORBUS, the diſeaſe of the joints, generally called the gout. See GOUT.

ARTICULATE *Sounds*, ſuch ſounds as expreſs the letters, ſyllables, or words of any alphabet or language; ſuch as are formed by the human voice.

ARTICULATED, ſomething furniſhed with or conſiſting of joints.

ARTICULATION, in anatomy, implies the juncture of two bones intended for motion.

Articulation is of two kinds, diarthroſis and ſynarthroſis, the former being that which admits of a manifeſt motion, and the latter that which allows only of an obſcure motion. See DIARTHROSIS and SYNARTHROSIS.

Diarthroſis is ſubdivided into enarthroſis, arthrodia, and ginglymus. See each under its proper article. And ſynarthroſis is ſubdivided into ſymphyſis, ſyntenoſis, ſutura, harmonia, ſyſſarcoſis, ſycondroſis, and ſynneuroſis. See the articles SYMPHYSIS, &c.

ARTIFICER, a perſon whoſe employment it is to manufacture any kind of commodity, as iron, braſs, wood, wool, linen, &c. ſuch as ſmiths, braziers, carpenters, weavers, ſpinners, &c.

ARTIFICIAL, ſomething made, faſhioned, or produced by art, in contradiſtinction to the productions of nature.

This term is as extenſive as the works of art. Thus we ſay artificial bath, day, earthquake, eye, fire, fountain, globe, rainbow, &c. See BATH, DAY, EARTHQUAKE, &c.

ARTILLERY, ordnance of all ſorts with their various appurtenances; as cannons, mortars, petards, muſquets, carbines, &c. See CANNON, MORTAR, &c.

ARTILLERY-PARK, a place generally in the rear of an army for encamping the artillery.

The artillery is drawn up in lines, of which one is formed by the ordnance: the ammunition waggons make two or three lines, ſixty paces behind the ordnance, and thirty diſtant from one another: the pontoons and tumbrils compoſe the laſt line. The whole is ſurrounded with a rope, which forms the park; the gunners and matroſſes encamp on the flanks; and the bombardeers, pontoon-men, and artificers in the rear.

Train of ARTILLERY, a certain number of pieces of ordnance mounted on carriages, with all their furniture, and every thing neceſſary for marching.

ARTILLERY-COMPANY, a band of infantry, conſiſting of ſix hundred men, forming part of the militia or city guard of London.

ARTIST, a perſon ſkilled in ſome art.

ARTOTYRITES, in eccleſiaſtical hiſtory, a ſect in the primitive church, who uſed bread and cheeſe in celebrating the euchariſt.

The word is formed from the Greek, *αρτος*, bread, and *τυρος*, cheeſe.

They were a branch of the montaniſts, and appeared in the ſecond century. They admitted women into the prieſthood and epiſcopacy; and Epiphanius tells us, that it was a common thing to ſee a body of ſeven girls enter their church, dreſſed in white, and each carrying a torch in her hand, where they wept and bewailed the wretchedneſs of human nature, and the miſeries of this life.

ARVAL **Brothers**, *Arvales fratres*, in antiquity, a college of twelve prieſts, inſtituted by Romulus, who preſided over the ambervalia, or ſacrifices, annually offered to Bacchus and Ceres

The word is Latin, and derived from *arvum*, a field; becauſe they offered ſacrifices for the fertility of the field.

Fulgentius has given us the following account of their original: "The nurſe of Romulus, called Laurentia, "had a cuſtom of offering a ſacrifice annually to the "gods for obtaining a plentiful crop; and in theſe re- "ligious exerciſes ſhe was accompanied with her twelve "children. But one of them happening to die, Ro- "mulus, in complaiſance to his nurſe, aſſiſted himſelf to "complete the original number, and gave them the title "of the twelve arval brothers, which they kept ever "after."

They held their aſſemblies in the temple of Concord, and wore on their heads a crown compoſed of the ears of corn, tied together with a white ribbon. Some add, that they were entruſted with the authority of determining the limits of lands and inheritances.

ARUM, wake-robin, or cuckow-pint, in botany, a low perennial plant, growing wild under hedges and by the ſides of banks. It ſends forth, in March, three or four ſmooth leaves, triangular, or ſhaped like the head of a ſpear: theſe are ſucceeded by a naked ſtalk, bearing a purpliſh piſtil incloſed in a long ſheath, which is followed, in July, by a bunch of red berries: the root is irregularly roundiſh, about an inch thick, browniſh on the outſide, and white within. In ſome plants the leaves are ſpotted with black, in others with white ſpots, and in others not ſpotted at all: the black ſpotted ſort is ſuppoſed to be the moſt efficacious; and hence is expreſsly directed by the London college. All the ſorts are ſaid to be ſtronger, when produced in moiſt ſhady ſoils, than in dry open expoſures.

The freſh roots of arum have an extremely pungent acrimonious taſte; ſlightly chewed, they continue to vellicate and burn the tongue (the part which they principally affect) for many hours, producing at the ſame time a conſiderable thirſt: theſe uneaſy ſenſations are ſomewhat alleviated by milk, butter, or oils. The other parts of the plant are likewiſe acrid, though rather leſs ſo than the roots. No part has any ſmell, except the piſtil, which has a faint fetid one.

This root loſes great part of its acrimony on being dried ſufficiently to become pulverable. Kept for ſome time, it ſeems, on firſt chewing, to be an inſipid farinaceous ſubſtance: it ſtill, however, retains a kind of latent pungency, ſo as when chewed long, in any conſiderable quantity, to produce a ſenſation as of a ſlight excoriation of the tongue. Parkinſon obſerves, that the farinaceous ſtarch-like powder has been uſed in waſhing, and that it has bliſtered the hands.

The freſh root, dug up in autumn, yields upon expreſſion about one ſixth its weight of a milky juice; which, on ſtanding, depoſited a white fecula, and became clear: the clear liquor was inſipid: the fecula was conſiderably pungent; but, like the root in ſubſtance, loſes its pungency on being dried. The freſh and the moderately dried roots were digeſted in water, in wine, in proof ſpirit, and in rectified ſpirit, with and without heat: the liquors received no colour, and little or no taſte. In diſtillation, neither ſpirit nor water brought over any ſenſible impregnation from the arum: the watery and ſpirituous extracts alſo were nearly inſipid. The root, nevertheleſs, loſes in theſe operations almoſt the whole of its pungency.

Arum root, newly dried and powdered, is given in doſes of a ſcruple and upwards; for ſtimulating the ſolids, attenuating viſcid juices, and promoting the natural ſecretions; in cold, languid, phlegmatic habits; againſt weakneſs and relaxations of the ſtomach, and catarrhous and rheumatic diſorders. It has been generally given in conjunction with other materials, to ſome of which the effects of the compound may be in great part aſcribed: thus, in the officinal powders of arum, ſixteen grains of the dry root are accompanied with eight grains of the pungent roots of pimpinella, the ſame quantity of thoſe of the yellow water flag, (or of calamus aromaticus) four grains of cinnamon, (or ſix of canella alba) and two grains of ſalt of wormwood, (or of vitriolated tartar) with four grains of crabs-eyes. In the medicine, recommended by Sydenham againſt rheumatiſms, the acrid antiſcorbutic herbs are largely joined to it.

By beating the freſh root with gummy reſins, and making the mixture into pills, its virtue might be better preſerved than in the form of powder: the proportions of the gums, in theſe compoſitions, may be very conſiderable; two or three grains of the arum, in its vigorous ſtate, being a ſufficient doſe. Beaten with ſugar into a conſerve, it likewiſe preſerves its acrimony unabated for ſeveral months; its virtue ſeeming to be retained as long as its native aqueous humidity. The vinous and ſpirituous tinctures, by ſome recommended, appear, from the experiments above related, to be inſignificant; but though ſpirituous liquors are incapable of diſſolving or extracting the active matter of the arum, they ſeem nevertheleſs, when given along with the dried root as a vehicle, to promote its action. Juncker obſerves, that a dram of the powder, taken with a ſpoonful of brandy, procures a very copious ſweat, even in perſons little diſpoſed to that evacuation; while the powder, by itſelf, has no ſuch effect. *Lewis's Hiſtory of the Materia Medica.*

ARUNDELIAN *Marbles*. See Marble.

ARUSPICES, in antiquity, an order of prieſts among the Romans, that pretended to foretel future events, by inſpecting the intrails of beaſts killed in ſacrifices.

The word is Latin, and derived from *aſpicio*, to view.

The aruſpices were conſulted on occaſion of all portents and prodigies. Women were admitted into this order.

ARYTÆNOIDES, in anatomy, the name of the third and fourth cartilages of the larynx. See Larynx.

The word is formed from the Greek, αρυταινα, an ewer, and ειδος, reſemblance, they being thought to reſemble an ewer in ſhape.

ARYTÆNOIDEUS, in anatomy, one of the muſcles that cloſes the larynx, having its head inſerted in one arytænoid cartilage, and its tail in the other; ſerving at once to draw them together, and ſhut the rima, or glottis.

ARYTHMUS, among phyſicians, implies the want of a juſt modulation in the pulſe; and is oppoſed to eurythmus, or a pulſe modulated according to nature.

The word is Greek, αρυθμος, and compounded of α, priv. and ρυθμος, meaſure.

AS, in antiquity, a particular weight, among the Romans, conſiſting of twelve ounces, and was the ſame with what they called libra, or a pound.

As was alſo the name of a Roman coin, which was of different weights and different matter in different ages of the commonwealth.

Euſebius tells us, that, under Numa Pompilius, the Roman money was either of wood, leather, or ſhells. In the time of Tullus Hoſtilius it was of braſs, and called *as*, *libra*, *libella*, or *pondo*; becauſe actually weighing a pound, or twelve ounces.

Four hundred and twenty years after, the firſt Punic war having exhauſted the treaſury, they reduced the *as* to two ounces. In the ſecond Punic war, Hannibal preſſing very hard upon them, they reduced the *as* to half its weight, viz. to one ounce. And laſtly, by the Papirian law, they took away half an ounce more, and conſequently reduced the *as* to the diminutive weight of half an ounce: and it is generally thought that it continued the ſame during the commonwealth, and even till the reign of Veſpaſian. The *as* therefore was of four different weights in the commonwealth. Its original ſtamp was that of a ſheep, ox, or ſow. But from the time of the emperors, it had on one ſide a Janus with two faces, and on the reverſe, the roſtrum or prow of a ſhip.

As was alſo uſed to denote any integer or whole; and hence the Engliſh word *ace*.

ASA, or Assa, in the materia medica, an epithet applied to two very different ſubſtances, called aſa-dulcis, and aſa-fœtida.

Asa-dulcis is the ſame with benzoin. See the article Benzoin.

Asa-foetida is a kind of gum, of a very offenſive ſmell, produced by a plant common in ſome parts of Perſia.

The plant which produces it is one of the pentandria digynia of Linnæus, and one of the herbæ umbelliferæ ſemine foliaceo, ſeu ala foliacea cincto of Ray. We had a multitude of various and falſe accounts of it for a long time; Garcias telling us it had leaves like the hazel; and Bontius making two plants of it, one like a willow, and the other with a root like a turnip; ſome have given it leaves like the fig-tree, ſome like thoſe of rice; and others have made it a ſhrub of the phylleræa kind. Kæmpfer is the author to whom we owe the true account of it. This is given in his Amœnitates Exoticæ, where he deſcribes it fully and accurately, under the name of umbellifera leviſtico affinis foliis inſtar pæoniæ ramoſis, caule pleno maximo, ſemine foliaceo nudo ſolitario brancæ urſinæ ſive paſtinachæ ſimili radice aſam fætidam fundente. The Perſians call both the plant and the juice hingeſch; and the Indians, hiing; but the more accurate in both countries call the plant hingeſch, and the juice or gum hiing.

The root of this plant is perennial, and very large. It is covered with a thick black rhind, which eaſily comes off from the reſt, when freſh. Within it is perfectly white, and full of white, milky, and ſtinking juice, which, when collected and dried, is what the Perſians call hiing, and the Europeans aſa-fœtida. The top of this root is furniſhed with a large tuft of hairy or filamentous matter, like that on the crown of the meum or ſpignel. The leaves are very large, and like thoſe of the piony.

The ſtalk is as thick as a man's arm, and grows to eight or nine feet high. It gradually becomes taper toward the top, whence it is divided into a ſmall number of branches. The leaves ſtand alternately on theſe ſtalks, and that at no great diſtances from one another. The flowers are ſmall, and diſpoſed in umbels. The ſeeds are flattiſh and ſtriated, and of an oval figure; they have ſomewhat of the aſa-fœtida ſmell, but much leſs than might be expected. It grows in Perſia, but there only in two places, at leaſt in thoſe only in any great plenty. Theſe are the mountains about Heraat, and the province of Laar. In theſe places it abounds with juice, and yields the gum in great plenty; when found elſewhere, it yields very little. The leaves in theſe places are of a horrible, offenſive ſmell, and no animal will touch them: but the people of the town of Diſguum affirm, that, in the country beyond them, the plant loſes much of its bad ſmell, and that the goats feed very greedily on the leaves, and grow fat upon the diet. Some have pretended to diſtinguiſh two ſpecies of this plant, the one yielding a ſmaller quantity of juice, and that of a leſs fetid ſmell; the other yielding more of it, and that more ſtinking: but Kæmpfer, who was upon the ſpot, declares the plants to be the ſame, and all the difference to be in the ſoil that produces them. If what the Perſians of Diſguum ſay be true, however, it very well accounts for the difference of the Cyrenaic and Perſian kinds of ſilphium; for the plant, in the firſt of theſe places, might be as mild as beyond Diſguum, or even more ſo.

It is very ſingular in this plant, that it ſeldom flowers, ſometimes not till its twentieth, thirtieth, or even fortieth year; during all this time the root is increaſing in ſize, and, conſequently, it ſometimes grows to an enormous bulk: roots of it have been ſeen of the thickneſs of a man's thigh, and of a yard and a half in length; thoſe of the thickneſs of one's arm are frequent. When it ſends forth a ſtalk, and has ripened its ſeed, it periſhes. The ancients made a diſtinction in their ſilphium, as it was produced from the ſtalk, or from the root of the plant; but, at this time, all that we have is obtained from the root. They never make inciſions in roots of leſs than four or five years ſtanding; and they always find, that, the older and larger the root, the more plentifully the juice flows.

The gum or juice, as it flows from the root, is white, and perfectly reſembles cream, and has no viſcidity: on the contact of the air it dries or hardens, and becomes viſcous and coloured. The moſt ſtrongly ſcented aſa-fœtida is always eſteemed the beſt; and Kæmpfer obſerves, that it is ſo much ſtronger, when freſh, than when kept and imported into Europe, that a dram of it has more ſcent than an hundred weight of what our druggiſts keep.

The leaves of the plant appear in autumn, and continue green the whole winter; in ſpring they wither. About the end of April, when their leaves are in their decaying ſtate, the Perſians aſcend the mountains in ſearch of the plants. They clear away the earth about the root for ſix or ſeven inches deep; they then twiſt off the leaves, and the fibrous ſubſtance at the top of the root. They next earth up the root again to its top, which is now perfectly bare; and this they cover with a bundle of weeds, to keep off the heat of the ſun, which would otherwiſe deſtroy it. They lay a ſtone over all this, to keep it firm, that the wind may not blow it off; and in this condition they leave the roots for a month or ſix weeks. At the end of this time, they take off the covering, clear away the earth a little from the crown of the root, and, with a ſharp knife, cut it tranſverſly off, taking off about an inch, or a little more, of the top. They then cover this wounded root with the weeds again, making them ſtand hollow from the wounded part, and thus leave them for two days; at the end of which time they return, and find the top of the root, where they had cut it off, covered with exſudated juice, or aſa-fœtida: this they collect, and put up in proper veſſels; and, clearing away the earth a little lower, they cut off another ſlice from the top of the root, but this not thicker than a crown-piece, and cover it up again for another gathering. As they take a large compaſs of ground for their ſearch, they are kept in conſtant employment; the roots of their firſt day's cutting being ready for their taking the gum from, by that time they have cut the more diſtant ones, which they are regularly to return to afterwards. After they have gone through this ſecond operation with all the roots, and collected the ſecond quantity of gum from them, they cover them up for eight or ten days; and, after having ſpread their gum in the ſun to harden it, they carry it home. Four or five men generally go out in a company, on theſe expeditions; and it is a common thing for them to bring home 50 lb. weight of it from this firſt gathering; this, however, is eſteemed but an inferior kind of aſa-fœtida; after the roots have remained covered for eight or ten days, they viſit them again, take off the covering of the weeds, and collect the gum. They then cut off another ſlice of the root, and after that another, and then a third; this is done at the diſtance of two days between each operation, and the earth is every time cleared away to a proper depth, and the whole proceſs managed as before.

After the third collection in this ſecond expedition, they cover up the roots again, and return home with their ſtores, leaving them covered for three days. After this, they return to their work, and cut them again three ſeveral times at the ſame diſtances of time; and, after the third collection of this laſt expedition, they leave them to periſh; for they never recover this terrible operation. *Kæmp. Amœn. Exot.*

Aſa-fœtida is compoſed of a gummy and reſinous ſubſtance, the firſt in the largeſt quantity. Its ſmell and taſte reſide in the reſin; which is readily diſſolved and extracted by pure ſpirit, and the greater part with the gummy matter by water. It is by much the ſtrongeſt of the deobſtruent warm fetid gums; and is given not only againſt hyſterical complaints, flatulent cholics, and obſtructions of the breaſt, but in moſt nervous diſorders, in which it frequently acts as an antiſpaſmodic, and an anodyne: in ſome caſes muſk, and in others opium, are uſefully joined with it. Hoffman recommends it as one of the moſt powerful anthelmintics hitherto known. It is moſt commodiouſly taken in the form of pills, from a few grains to a ſcruple or half a dram. It loſes both its ſmell and ſtrength with age; a circumſtance neceſſary to be attended to in proportioning the doſes neceſſary to be given in order to procure the intended effect.

ASAPPES, or Azapes, an order of ſoldiers in the

Turkiſh army, whom they always expoſe to the firſt ſhock of the enemy.

The word is derived from *ſaph*, a word in the Turkiſh language ſignifying rank, file, or order.

ASARUM, aſarabacca, in botany, a low plant without ſtalks: the leaves are ſtiff, roundiſh, with two little ears at the bottom, ſomewhat reſembling a kidney, of a dark ſhining green colour, ſomewhat hairy, ſet on pedicles three or four inches long: the flowers, which riſe among the leaves on ſhorter pedicles, conſiſt of purpliſh ſtamina, ſtanding in a darker-coloured cup, and are each followed by a capſule, containing ſix ſeeds. It is perennial and ever-green, a native of the ſouthern parts of Europe and the warmer climates, and raiſed here in gardens. The dried roots have been generally brought from the Levant; thoſe of our own growth being ſuppoſed of weaker virtue.

The roots and leaves of aſarum have a moderately ſtrong, not very unpleaſant ſmell, ſomething reſembling that of valerian or nard; and a nauſeous bitteriſh acrid taſte. The roots given in ſubſtance, in doſes of a ſcruple or more, prove ſtrongly emetic and cathartic. The leaves have the ſame effect, but their doſe or degree of ſtrength has not been preciſely determined; ſome ſay they are of more activity than the roots.

Its principal uſe among us is as an errhine. The root is one of the ſtrongeſt of the vegetable ſubſtances commonly employed in this intention: a grain or two ſnuffed up the noſe, procure a large evacuation of mucus, both from the mouth and noſtrils, without provoking ſneezing, like the white hellebore root, or diſcovering any remarkable irritation. Geoffroy relates, that after ſnuffing up a doſe of this errhine, he has obſerved the ſalutary diſcharge to continue for three days ſucceſſively, and that he has known a paralyſis of the mouth and tongue cured by one doſe. He recommends this medicine in ſtubborn diſorders of the head proceeding from viſcid matters, in palſies, and in ſoporific diſtempers. During its operation the patient muſt carefully avoid the cold, which is apt to produce puſtules, inflammations, and ſwellings of the face, and ſometimes more alarming ſymptoms. This herb is the principal ingredient in the cephalic, or ſternutatory powders of the ſhops: ſome take equal parts of dried aſarum, and marjoram leaves; others equal parts of the dried leaves of aſarum, marjoram, and marum ſyriacum, and dried lavender flowers. The empyrical herb ſnuffs have likewiſe the leaves of aſarum for their baſis; but often mixed with ingredients of a more dangerous nature.

ASBESTINE, ſome incombuſtible body, or that partakes of the nature and properties of aſbeſtos.

ASBESTOS, ſalamanders wool, in natural hiſtory, the ſame with amianthus. See the article Amianthus.

The word is Greek, and compounded of *α*, priv. and *σβεννυμαι*, to extinguiſh.

ASCARIDES, in medicine, a ſpecies of worms, very ſlender, found in the inteſtinum rectum, chiefly of children, and frequently voided with the fœces. They often adhere to the fundament, and are ſometimes even pendent from it.

The word is Greek, and derived from *ασκαριζω*, to leap; becauſe of their continual motion, which cauſes an intolerable itching.

ASCENDANT, or Ascending *Line*, in genealogy, is underſtood of anceſtors, or ſuch relations as are nearer the root of the family.

Ascendant, in aſtrology, implies the horoſcope, or that degree of the equator which is riſing above the horizon in the eaſt, at the time of the birth of any perſon.

ASCENDENS *Obliquus*, in anatomy. See Obliquus.

ASCENDING, in aſtronomy, is applied to ſuch celeſtial objects as are riſing above the horizon, in any parallel of the equator.

Ascending *Latitude of a Planet* is the latitude of a planet moving towards the north-pole.

Ascending *Node*, that point of a planet's orbit where it paſſes the ecliptic, in its motion towards the north. See Node.

Ascending *Signs*, among aſtrologers, are thoſe riſing from the nadir towards the zenith.

Ascending *Veſſels*, in anatomy, thoſe which carry the blood upwards, as the aorta aſcendens, and vena cava aſcendens.

ASCENSION, in a general ſenſe, implies a moving upwards.

Ascension, in aſtronomy, is either right or oblique.

Right Ascension of the ſun, or of a ſtar, is the arch of the equinoctial, intercepted between the vernal equinoctial point, and the meridian that the ſun or ſtar appears in.

The reaſon of thus referring it to the meridian, is, becauſe that is always at right angles to the equinoctial; whereas the horizon is only ſo in a right or direct ſphere.

The right aſcenſion ſtands oppoſed to the right deſcenſion. Two fixed ſtars, which have the ſame right aſcenſion, i. e. are in the ſame meridian, riſe at the ſame time in a right ſphere. If they be not in the ſame meridian, the difference between the time when they riſe is the preciſe difference of their right aſcenſion. In an oblique ſphere, where the horizon cuts all the meridians obliquely, different points of the meridian never riſe or ſet together; ſo that two ſtars on the ſame meridian never riſe or ſet at the ſame time, and the more oblique this ſphere is, the greater is the interval of time between them.

To find the right aſcenſion of the ſun, ſtars, &c. trigonometrically, ſay, As radius is to the coſine of the ſun's greateſt declination, ſo is the tangent of the ſun's longitude from Aries, or Libra, to the tangent of right aſcenſion.—To find the right aſcenſions mechanically by the globe, ſee Globe.

Oblique Ascension is an arch of the equinoctial intercepted between the vernal equinoctial point, and that point of the equinoctial which riſes with the ſun or ſtar.

In order to find the oblique aſcenſion, we muſt firſt find the aſcenſional difference.

ASCENSIONAL *Difference* is the difference between the right and oblique aſcenſion of the ſame point on the ſurface of the ſphere, or it is an arch of the equator intercepted between the points of right and oblique aſcenſion.

To find the aſcenſional difference of the ſun, ſtars, &c. trigonometrically, ſay, As the tangent of the complement of the latitude is to radius, ſo is the tangent of the declination to the ſine of the aſcenſional difference, which being found muſt be added to the right aſcenſion, if the declination and latitude be of different denominations; that is, one north and the other ſouth: but if of the ſame denomination, that is, both north or both ſouth, ſubtracted from the right aſcenſion, ſo will the ſum or remainder be the oblique aſcenſion required.

The aſcenſional difference is always equal to the exceſs or defect of the ſemi-ſolar day, above or under ſix hours; and, conſequently, if (according as the caſe requires) it be reduced into time, by allowing 15°. for one hour, &c. and added to, or ſubtracted from, ſix hours, we ſhall have the length of the day and night, and thence the true time of the ſun's riſing and ſetting. And becauſe, when the ſun is in the equinoctial, or that point where the ecliptic, equinoctial, horizon, and prime vertical, interſect each other, as ♈, he riſes and ſets exactly at ſix o'clock; hence, if the ſun riſes before he arrives at the prime vertical, or ſix o'clock hour circle, he will riſe before ſix of the clock; and, conſequently, we muſt add the aſcenſional difference to ſix hours, to obtain the length of the ſemi-ſolar day; or to twelve hours, to obtain the length of the ſolar day, which will always happen in north latitude, when the ſun hath north declination, and in ſouth latitude, when he has ſouth declination: but if he does not riſe till he has paſſed the prime vertical, we muſt ſubtract the aſcenſional difference from ſix hours, to find the length of the ſemi-ſolar day, which will always happen in north latitude, when he has ſouth declination, and in ſouth latitude, when he has north declination.

To find the oblique aſcenſion, and aſcenſional difference, mechanically, by the globe, ſee Globe.

ASCENT, in a general ſenſe, implies the motion of a body upwards.

Ascent *of Fluids*. See the articles Fluid and Attraction.

ASCENT *of Vapours.*—Why vapours are raiſed by heat is no inconſiderable queſtion. And, among other things, we do not improperly ſuppoſe in theſe vapours inſenſible bubbles, conſiſting of a pellicle of water and included air. Such a bubble, therefore, being given, but which may contain air rarer than the circumambient, it is poſſible that the rarity of the included air may have greater force than the weight of the including pellicle of water: and therefore, that the entire bubble may be lighter than circumambient air of equal bulk, whereby the bubble, by the laws of hydroſtatics, will aſcend in the ſame manner as a cloſe veſſel of iron full of air would in water, if in proportion to its weight it have a ſufficient capacity; nor is the elaſtic force of the ambient air of greater force in this caſe than the gravity of a column of air; becauſe the elaſtic force in each part ariſes from the gravity of the column. But here will ariſe a great difficulty, namely, that the circumambient air leſs rare than the included air ſeems, by its elaſtic force, as if it would compreſs the bubble; and thus the included air will become of a denſity equal to that of the circumambient air. We are here, therefore, to obſerve, that there is a two-fold force in air, whereby it dilates itſelf, or preſerves its dilatation; the one innate, the other adventitious. The former is the elaſtic force, which exerts itſelf, not only when it is compreſſed into a leſs compaſs than uſual, as in wind-guns, but likewiſe in common air, which, as is evident from the experiments of the air-pump, when preſſed by the incumbent air, does, upon removing that preſſure, expand itſelf, if no other air be equally compreſſed, or any other impediment hinder; for flaccid bladders are ſpontaneouſly inflated under the receiver, nay even in the free air, if they are carried from a valley to a high hill; becauſe there they are leſs compreſſed.

The adventitious expanſive force of the air, which ſupplies the place of its elaſticity, is either heat or ſomething elſe analogous to heat in fermentation, or the like natural operation. Thus, it is poſſible that the air included in the bubble, and rarer than the circumambient air, may yet maintain itſelf, and ſuffer a compreſſion from it, which is manifeſt by the experiment of thermometers; and the greater the heat is, or any other force that internally dilates the air, the more will the aqueous pellicle be extended, and become the thinner. But here a new queſtion ariſes, namely, how ſuch bubbles can be formed, ſeeing the heat both of the included and circumambient air ſeems to be the ſame; in anſwer to this, it is to be obſerved, that the included air ſhall acquire a greater degree of heat than that which even the particles of the external air have; becauſe the circumambient air has both a greater and a different motion from the bubble: whence new hot particles thereof continually flowing to the ſame bubble like a hot wind, communicate a new degree of heat to the pellicle, and through it to the included air by the continued contact of new air, as we feel that the hand grows either warmer or colder, if moved in hot or cold water, than if it was at reſt therein: and it is the ſame thing, if the water be moved about the hand, becauſe many aqueous particles ſucceſſively touch the ſame part of the hand, and communicate their quality thereto. From this principle, it appears, that wine, in a glaſs bottle, ſwiftly moved up and down in cold water, or the water moved about the bottle, is the ſooner cooled.

Now, if we underſtand the cauſe why the bubbles of vapours aſcend, it will be no difficult matter to explain why they fall down again: for upon the heat gradually vaniſhing, the bubble will be compreſſed by the circumambient air; ſo that the included air, upon the ceaſing of the adventitious dilatation, ſhall return to a like denſity therewith; upon which the aqueous pellicle can neither aſcend in the air, nor ſupport itſelf therein, no more than an iron veſſel can float, or aſcend in water, if it is filled therewith. However, it is poſſible, and it uſually is ſo, that the vapours that are even ready to fall down, remain a little ſuſpended in the air, in the ſame manner in which duſt is ſuſtained therein; becauſe air, as all other fluids, has a certain degree of tenacity or coheſion of its parts, ſo as to require ſome degree of force, however ſmall, to break through it; and becauſe very ſmall bodies have a ſmall weight in proportion to their ſurface; yet, notwithſtanding their weight, they often remain ſuſpended, and they are only toſſed up and down by the motion of the ſuſtaining air. The ſame thing, therefore, happens to bubbles and very ſmall drops; but if a great number of drops concur, which is done by that very toſſing and motion, they coaleſce into a larger one, and becauſe the ſurfaces increaſe only as the ſquares, but the weights as the cubes of their diameters. Hence it is, that a bubble, or drop, by growing larger, acquires a ſufficient force to fall down; and even the ſuperior bubbles, falling on the inferior ones, coaleſce with them, and become bigger.

From theſe principles we ſhall now proceed to ſhew, by a calculus, how great the tenacity of aqueous particles in vapours muſt neceſſarily be, in proportion to the rarity of the included air, that ſuch vapours may aſcend.

Let 1 to d be the ratio of the denſity of the air included in a bubble to the ſpecific gravity of water, and p the weight of common air of the ſame bulk with a bubble of the vapour; let the center of the bubble be A, and A B the radius of the ſphere of included air, but A C the radius of the ſphere of the whole bubble, the ſpace of included air will be as the cube of A B, the ſpace of the whole bubble as the cube of A C, and the ſpace which the pellicle occupies as the difference of theſe cubes. Let us ſuppoſe that ſpace of the pellicle to be to the ſpace of the whole bubble, as 1 to r, the ſpace of the pellicle will be as the cube of $\frac{AC}{r}$, which is equal to the cube of A C — the cube of A B: therefore, the cube of A B is equal to the cube of AC — the cube of $\frac{AC}{r}$ equal the cube of $AC \times 1 - \frac{1}{r}$ equal the cube of $AC \times \frac{r-1}{r}$: and therefore, the cube of A B is to the cube of A C, as $r-1$ to r. But the weight of the included air is to that of common air of equal bulk with the bubble, or to p in the compound ratio of the volumes, (or of the cube of A B to the cube of A C, or $r-1$ to r) and of the ſpecific gravities; (1 to d) that is, in the ratio of $r-1$ to rd. The weight, therefore, of the included air will be $p \times \frac{r-1}{rd}$: the weight of the including pellicle of water will be in like manner to the weight of common air of equal bulk with the bubble in the compound ratio of the volumes, (1 to r by the hypotheſis) and of the ſpecific gravities 800 to 1; (water being 800 times the ſpecific gravity of air, by experiments) the weight of the pellicle, therefore, will be $\frac{800p}{r}$; but, adding the weight of the pellicle to the weight of the included air, we ſhall have the weight of the whole bubble, which will be $\frac{p \times \overline{r-1} + \overline{800d}}{rd}$, and that ſhould be leſs than p, the weight of common air of equal bulk with the bubble, that the bubble may aſcend therein; and $r-1+800d$, will be leſs than rd: and, therefore, rdr will be greater than $800d-1$; and, therefore, r will be greater than $\frac{800d-1}{d-1}$, or the ratio of the ſpace of the bubble to that of the pellicle, will be greater than $800d-1$ to $d-1$. Whence if d be 10, or if common air be 10 times denſer than the included air, the ratio of the ſpace of the bubble to that which the pellicle occupies, will be greater than the ratio of 7999 to 9, or greater than 888.777, &c. to unity; where 888 are unities, but 777, &c. is a decimal fraction; to wit, ,7,07,007, &c. as you would incline to be more exact: and, therefore, the ſpace of the whole bubble will, in this caſe, exceed that of the aqueous pellicle upwards of 888 times. The ratio of the thickneſs of the pellicle to the radius of the ſpherical bubble; that is, the ratio of AC — AB to A C may, from hence, be eaſily determined; for A B is to A C as $\left.\frac{r-1}{r}\right)^{\frac{1}{3}}$ to $r^{\frac{1}{3}}$. The thickneſs, therefore, of the pellicle is to the radius of the bubble as $1 - \left.\frac{r-1}{r}\right)^{\frac{1}{3}}$ to unity: beſides $r-1$ is to r as $\frac{r-1}{r}$ to unity; and ſince r is greater than $\frac{800d-1}{d-1}$, $\frac{1}{r}$ will be leſs than $\frac{d-1}{800d-1}$, and $\frac{r-1}{r}$ will be greater than $1-\frac{d-1}{800d-1}$, or than $\frac{800d-1-d+1}{800d-1}$, or than $\frac{799d}{800d-1}$: therefore $\overline{\frac{r-1}{r}}\Big|^{\frac{1}{3}}$ is greater than $\overline{\frac{799d}{800d-1}}\Big|^{\frac{1}{3}}$; therefore at length $1-\overline{\frac{r-1}{r}}\Big|^{\frac{1}{3}}$, or the thickneſs of the pellicle, if unity expreſs the radius of the bubble, is leſs than $1-\overline{\frac{799d}{800d-1}}\Big|^{\frac{1}{3}}$, that the bubble may aſcend in air.

By the rules which Archimedes has given, it appears that if a veſſel contain a weight of water greater than its own weight, it will float therein; but if ſtill greater veſſels be taken, the weights of the veſſels increaſe nearly as the ſurfaces; but their capacities as the ſolidities, that is, the weights of the veſſels are as the ſquares of the diameters, the capacities (and conſequently the weight of water they contain) as the cubes; and thus, by augmenting the capacity of the veſſel, the weight of the veſſel is immediately overcome by the weight of what it can contain, and the veſſel may float.

From this principle Franciſcus Lana, an ingenious Jeſuit, in an Italian Treatiſe, entitled *Prodromo della arte Maeſtra*, had conceived hopes, that a braſs globe might be made of ſuch a capacity, that, when exhauſted of air, it might aſcend and float therein; and for this purpoſe he was of opinion that 16 feet in diameter was ſufficient: but by calculation it may be ſhewn that a globe for that purpoſe muſt be of an immenſe bulk, and which cannot be eaſily prepared by human ſkill; in order to which, let the ſpecific gravity of the metal be to that of air, as m to 1; and as inſtead of a pellicle of water, we uſe a hollow metalline ſphere, therefore, for 800 in the foregoing proceſs, there will be m, and, inſtead of $\frac{800d-d}{800d-1}$, there will be $\frac{md-d}{md-1}$: but as, upon ſuppoſing the greateſt ſenſible exhauſtion of the ſphere, the denſity of the air remaining in it may be reckoned none, we ſhall have d (a number expreſſing the ratio of common air to included air) an infinite number; and thus $md-1$ will become md; and, therefore, for $\frac{md-d}{md-1}$, we ſhall have $\frac{md-d}{md}$ or $\frac{m-1}{m}$, the quantity d vaniſhing, by which the different denſities of the air are compared; the ratio, therefore, of the thickneſs of the metal to the radius of the ſphere, will be leſs than the ratio of $1-\overline{\frac{m-1}{m}}\Big|^{\frac{1}{3}}$ to unity. The ſame thing would have come out, if at firſt we had neglected the weight of the included air; nor ſhould we have occaſion for an infinite number; but ſuch a number was of uſe, that the caſes of rarefied and entirely exhauſted air might be comprized in one calculus.

The gravity of copper is about 9 times greater than that of water. It will therefore contain the gravity of common air 7200 times, and $\frac{m-1}{m}$ will be $\frac{7199}{7200}$, or $\frac{7199\times30}{8\times27\times1000}$, or 215970 divided by 8 × 27 × 1000, where the cube root of the diviſor may be exactly extracted, and is 2 × 3 × 10 or 60; and hence $\overline{\frac{m-1}{m}}\Big|^{\frac{1}{3}}$ will be the cube root of 215970 divided by 60; therefore, the cube root of $\frac{m-1}{m}$ will fall between $\frac{59997}{60000}$ and $\frac{59998}{60000}$; that is, $\frac{59997}{60000}$ will be leſs than the ſaid cube root, and $\frac{60000-59997}{60000}$, or $\frac{3}{60000}$; that is, $\frac{1}{20000}$ will be greater than $1-\overline{\frac{m-1}{m}}\Big|^{\frac{1}{3}}$, whoſe ratio to unity is greater than the ratio of the thickneſs of the metal to the radius of the ſphere, the ratio therefore of $\frac{1}{20000}$ to 1, or 1 to 20000 will be ſtill greater than the ratio of the thickneſs of the metal to the radius of the ſphere; the thickneſs of the metal, therefore, is to be aſſumed leſs, or if that be given, greater than the ſphere. Hence it follows, that the radius of the metalline ſphere will contain the thickneſs of the metal more than 20000 times, for the exhauſted ſphere to float in air; and, therefore, if the thickneſs of the metal be one inch, or 2 or 3 inches, the diameter of the metalline ſphere will be 3333, or 6666, or 9999 feet, and in the mean caſe, to wit, that of 2 inches and 6666 feet, the diameter of the ſphere will be more than 1000 paces; but if the radius of the ſphere were only 8 feet, as Franciſca Lana would have it, the thickneſs of the metal ſhould have been $\frac{1}{2500}$ of a foot; that is, leſs than $\frac{1}{200}$ of an inch, which is impoſſible.

Nor is it, indeed, to be ſuppoſed that the thickneſs of 2 inches is ſufficient to ſuſtain the immenſe incumbent bulk of the air: for how could ſo ſmall a thickneſs ſuſtain a weight as great as that of water diffuſed for 1000 paces, and riſing to the height of 30 feet, which weight would be equal to that of air; and neither can that accurate uniformity of a ſpherical arch, which would be requiſite, be obtained in practice; and though it ſhould be granted, that by a thickneſs of the arch 2 or 3 times greater, its reſiſtance is more than 4 or 9 times, and thus in theory (that is, if we could actually perform what we conceive poſſible) the problem would at length be poſſible, yet in practice to form ſpheres of ſo immenſe a bulk, and that of metal, as copper, or iron, does certainly exceed the power of all human ſkill.

ASCETICS, in eccleſiaſtical hiſtory, ſuch Chriſtians in the primitive church as inured themſelves to great degrees of abſtinence and faſting, in order to ſubdue their paſſions. In ſhort, every degree of uncommon piety laid claim to the title of aſcetic.

The word is formed from the Greek, *ασκητικα*, which is derived from *ασκεω*, to exerciſe.

ASCII, in geography, are the inhabitants of the torrid zone; becauſe, at certain times of the year, they have no ſhadow.

The word is compounded of the Greek, *α*, priv. and *σκια*, a ſhadow.

ASCITES, in medicine, the ſame with dropſy. See DROPSY.

ASCLEPIA, in antiquity, a feſtival of Æſculapius, the god of phyſic; and obſerved particularly at Epidaurus.

ASCLEPIAD, in ancient poetry, a ſpecies of verſe compoſed of four feet, the firſt of which is a ſpondee, the ſecond a choriambus, and the two laſt dactyls; or, of four feet and a cæſura, the firſt being a ſpondee, the ſecond a dactyl, then the cæſura, and after that the two dactyls, as

Mæcenas atavis edite regibus. Or,
Sublimi feriam ſidera vertice.

ASCLEPIODOTÆANS, in eccleſiaſtical hiſtory, a ſect of heretics that appeared in the time of the emperor Heliogabalus, and ſo called from their leader Aſclepiodotus, the firſt who taught that Jeſus Chriſt was a mere man.

ASCORDRUTÆ, in antiquity, a ſect of heretics in the ſecond century, who placed all religion in knowledge; and, under pretence of ſpiritual worſhip, refuſed every external or corporeal ſymbol.

ASCOLIA, in antiquity, a feſtival celebrated by the Athenian huſbandmen, in honour of Bacchus, to whom they ſacrificed a he-goat, becauſe that animal deſtroys the vines.

The word is Greek, and derived from *ασκος*, a bottle; it being cuſtomary at this feſtival to form the victim's ſkin into a kind of bottle, which was filled with oil and wine, and fell to the ſhare of him who firſt fixed himſelf upon it with one foot.

ASCUS, in natural hiſtory, the pouch, or bag of the opoſſum. See OPOSSUM.

ASELBES, a name given by ſome to the millipedes. See MILLIPEDES.

ASH, fraxinus, in botany, a genus of trees, whoſe characters are: it hath pinnated leaves, which moſtly end in an odd lobe: the male flowers, which grow at a remote diſtance from the fruit, have no petals, but conſiſt in many ſtamina; the ovary becomes a ſeed-veſſel, containing one ſeed at the bottom, which is ſhaped like a bird's tongue.

There are ſix ſpecies of this tree; all which may be propagated by budding them into common aſh; upon which they will all take very well, and become hardier than upon their own ſtock: but theſe budded trees never grow ſo large as thoſe which are raiſed from ſeeds; nor will the ſtock and bud keep pace in their growth; ſo that there will be a remarkable difference in the ſize of the ſtem, and above the place where they are budded: but few of theſe foreign kinds have yet arrived at an age to produce ſeeds in England, the nurſery-gardeners having been obliged to propagate theſe ſorts by budding and grafting.

The common aſh is propagated by ſowing the keys in October or November, on a bed of freſh earth, which ſhould be well dug, and cleanſed from roots and noxious weeds. A ſmall bed will be ſufficient to raiſe a great quantity of theſe trees. The ſeeds ſhould be ſown pretty thick, and covered about half an inch thick with earth.

Theſe ſeeds, many times, continue until the ſecond ſpring before they come up; you ſhould, therefore, let the bed remain undiſturbed, and keep it clean from weeds. When your plants come up, you muſt alſo keep them very clear from weeds, and if the ſeaſon ſhould prove very dry, if you give them now and then a little water, it will greatly promote their growth. In this bed they ſhould remain no longer than the autumn following, provided they have grown well; at which time you ſhould prepare a nurſery, which ſhould be well dug and cleared, as before; then with your ſpade looſen the roots of the plants before you draw them up; otherwiſe you will endanger the breaking of them. When you have drawn them out of the ground, ſhorten the downright tap root; but do not cut off any of the lateral fibres; then, having prepared your ground, plant them in rows, three feet diſtance, row from row, and a foot aſunder in the rows, cloſing the earth to their roots with your feet.

In this nurſery they may remain two or three years, obſerving to keep them clear from weeds, as alſo to trim up the ſide branches every winter, and dig the ground between the rows; after which time you may remove them where they are to remain for good. This tree will grow upon almoſt any ſoil; but the better the ſoil is, the more the tree will increaſe in bulk. Notwithſtanding which, it ſhould not, by any means, be planted too near the other trees or plants; for it will exhauſt all the goodneſs of the ſoil from them; and the ſhade of this tree is malignant to moſt other plants. The diſtance they ſhould be planted is eight feet ſquare; and, after they have been planted one year, you may cut down every other tree, chooſing ſuch of them as are crooked, within ſix or eight inches of the ground; this will cauſe them to make many ſtrong, vigorous ſhoots; which, in ſeven or eight years time, will be fit for arbour poles, or to make hoops; and the other ſtraight trees may be ſuffered to grow for other timber; the number of which trees may be leſſened, as they increaſe in bulk, leaving ſtill the moſt promiſing ones to grow for larger timber.

If a wood of theſe trees is rightly managed, it will turn greatly to the advantage of its owner; for by the underwood, which will be fit to cut every ſeven or eight years, for the uſes abovementioned, there will be a continual income, more than ſufficient to pay the rent of the ground, and all other charges; and ſtill there will be a ſtock preſerved for timber, which, in a few years, will be worth forty or fifty ſhillings per tree.

This timber is of excellent uſe to the wheelwrights and cartwrights for ploughs, axle-trees, wheel-rings, harrows, bulls, oars, blocks for pullies, and many other purpoſes.

The beſt ſeaſon for felling of theſe trees is from November to February; for if it be done either too early in autumn, or too late in the ſpring, the timber will be ſubject to be infeſted with worms, and other inſects: but, for lopping of pollards, the ſpring is preferable for all ſoft woods.

ASHES, *Cineres*, the earthy particles of combuſtible ſubſtances after they have been burnt.

If the aſhes are produced from vegetable bodies, they contain a conſiderable quantity of fixt ſalt, blended with the terrene particles: and from theſe aſhes the fixed alkaline ſalts, called pot-aſh, pearl-aſh, &c. are extracted. See *Fixed* ALCALIES, POT-ASH, PEARL-ASH, &c.

The aſhes of all vegetables are vitrefiable, and found to contain iron. They are alſo an excellent manure for cold and wet grounds.

ASIA, one of the four grand diviſions of the earth, ſituated between 25 and 148 deg. of eaſt longitude; and between the equator and 72 deg. of north latitude. It is bounded on the north by the Frozen ocean; on the eaſt by the South-ſea; on the ſouth by the Indian ocean; and on the weſt by the Red-ſea, Mediterranean, &c. It is about 4800 miles in length, from eaſt to weſt, and 4300 in breadth, from north to ſouth.

Aſia is divided into three parts, diſtinguiſhed by the epithets, eaſtern, weſtern, and middle. The firſt comprehends the empire of China, Chineſe Tartary, and the Aſiatic Iſlands, lying to the ſouth and eaſt of China; the ſecond, or weſtern diviſion, comprehends Perſia, Arabia, Aſtracan, Circaſſin-Tartary, and Turkey in Aſia. The middle comprehends India, Uſbec-Tartary, Calmuc-Tartary, and Siberia.

Leſſer ASIA, the ſame with Natolia. See NATOLIA.

ASIATIC, ſomething peculiar to Aſia.

ASIATIC *Style*. See STYLE.

ASIDE, in the drama, ſomething ſaid by an actor, which ſome, or even all the other actors preſent, are ſuppoſed not to hear; a circumſtance juſtly condemned as being unnatural and improbable.

ASINUS, in natural hiſtory, the aſs. See ASS.

ASP, in natural hiſtory, a ſpecies of ſerpents often mentioned by the ancients, but without any accurate deſcription of it. Some ſay it is of the ſize of a common ſnake, but the back broader; and the neck ſwells greatly when the creature is angry. Some aſſert that their teeth grow exceeding long, and ſtand out of their mouths like thoſe of the boar; but this ſeems to be fabulous. However, it may be true, that two of the longeſt are hollow, and that they are thoſe which contain the venom. They are generally covered with thin pellicles, which ſlide down when the ſerpent bites. The ſkin is ſaid to be covered with ſcales, which are redder than thoſe of any other ſerpent; but others affirm they are of very different colours. Some ſay they are two cubits long, others four, and others again five; Peter Kolben affirms he has ſeen them ſeveral ells in length: ſo that, in ſhort, nothing certain can be known of the aſp. It is undoubtedly a native of Africa; and it was by the bite of one of theſe ſerpents that Cleopatra is ſaid to have ended her days.

Seba gives the name of aſp to ſeveral ſerpents, the firſt of which is ſaid to be found in Egypt, and is ſpotted with black. The ſkin is of a reddiſh aſh-colour, marked with black ſpots; whereas thoſe on the back nearly reſemble eyes. The head is of a dark brown, ſurrounded with a white colour; and the ſcales of the belly are white, adorned with a reddiſh border. He has alſo an American aſp, which nearly reſembles this in every reſpect.

The Java aſp is of a ſea-green, with a ſharp mouth, and a long head covered with ſcales on the fore-parts. The other ſcales are alſo of a ſea-green colour, with white edges, except under the belly, where they are of a light green, and ſeparated from the reſt by two white ſtreaks running like furrows along the ſides.

The Surinam aſp is of a bright green colour, ſprinkled with blackiſh ſpots; but the belly is of an aſh-coloured red, and the head is of a deep green; the eyes are lively, and the tail is terminated with ſharp points. *Brookes's Natural Hiſtory.*

ASPHALATHUM, in natural hiſtory, the ſame with lignum Rhodium. See LIGNUM *Rhodium*.

ASPARAGUS, in botany, the name of a genus of plants, whoſe flower is of the roſaceous kind, being uſually compoſed of ſix leaves, arranged in a circular form; from the center of the flower ariſes a piſtil, which finally becomes a ſoft fruit, or a roundiſh berry, containing a number of hard ſeeds. To this it may be added, that the leaves are always fine and ſlender.

The garden aſparagus is propagated by ſowing of the ſeeds; in the procuring of which you ſhould be particularly careful, ſince the goodneſs of your future crop, in a great meaſure, depends thereon: you ſhould, therefore, get it from ſome perſon of integrity; or, if you have any opportunity, ſave it yourſelf; or in ſome other neighbouring garden. You muſt look over the aſparagus-beds in the beginning of the ſeaſon, and mark ſome of the largeſt and faireſt buds with a piece of ſtick; which buds, when they have branched out, may be faſtened to ſtakes thruſt into the ground, to preſerve them from breaking. Theſe buds will, many of them, produce great numbers of red berries, which ſhould be ſuffered to remain upon the branches until the latter end of September, when the haulm will begin to decay; then cut off the branches, and ſtrip the berries into a tub, where they may lie in an heap to ſweat for three weeks, by which means the outer huſks will be rotten; then fill the tub with water, and with your hands break all the huſks, by ſqueezing them between your hands. Theſe huſks will all ſwim upon the water, but the ſeed will ſink to the bottom; ſo that, by pouring off the water gently, the huſks will be carried along with it; and by putting freſh water two or three times, and ſtirring your ſeed, you will make it entirely clean; then ſpread your ſeed upon a matt, and expoſe it to the ſun and air in dry weather, until it is perfectly dry, when you may put it into a bag, and hang it up in a dry place, till the beginning of February; at which time you muſt prepare a bed of good, rich earth, whereon you muſt ſow your ſeed; (but not too thick, which will cauſe your plants to be ſmall) and, having trod your ſeed into the ground, rake it over ſmooth.

In the following ſummer keep it diligently cleared from weeds, which will greatly add to the ſtrength of your plants; and toward the latter end of October, when the haulm is quite withered, you may ſpread a little rotten dung over the ſurface of the ground, about an inch thick, which will preſerve the young buds from being hurt by the froſts, &c.

In the ſpring following your plants will be fit to plant out for good; (for I would never chuſe plants of more than one year's growth, having very often experienced them to take much better than older, and to produce finer roots) you muſt therefore prepare your ground by trenching it well, burying therein a good quantity of rotten dung at the bottom of each trench, that it may lie at leaſt ſix inches below the ſurface of the ground: then level your whole plot very exactly, taking out all large ſtones; but this ſhould be done not long before you intend to plant your aſparagus, in which you muſt be governed according to the nature of your ſoil, or the ſeaſon; for if your ſoil is dry, and the ſeaſon forward, you may plant early in March; but, in a very wet ſoil, it is better to wait till the end of that month, or the beginning of April, which is about the ſeaſon that the plants are beginning to ſhoot. I know many people have adviſed the planting of aſparagus at Michaelmas; but this I have experienced to be very wrong; for in two different years I was obliged to tranſplant large quantities at that ſeaſon; but I had better thrown away the plants; for, upon examination in the ſpring, I found moſt of the roots mouldy, and decaying; and I am ſure, not one in five of them ſucceeded; and thoſe which did, were ſo weak as not to be worth their ſtanding.

The ſeaſon being now come, you muſt, with a narrow-pronged dung-fork, carefully fork up your roots, ſhaking them out of the earth, and ſeparating them from each other; obſerving to lay their heads even, for the more convenient planting them; which muſt be performed in this manner: Your plot of ground being levelled, you muſt begin at one ſide thereof, ranging a line very tight croſs the piece, by which you muſt throw out a trench exactly ſtraight, and about ſix inches deep; into which you muſt lay your roots, ſpreading them with your fingers, and placing them upright againſt the back of the trench, that the buds may ſtand forward, and be about two inches below the ſurface of the ground, and at twelve inches diſtance from each other; then, with a rake, draw the earth into the trench again, laying it very level, which will preſerve the roots in their right poſition: then remove your line a foot farther back, and make another trench in like manner, laying therein your plants, as before directed, and continuing the ſame diſtance row from row; only obſerving, between every four rows, to leave the diſtance of two feet four inches, for an alley to go between the beds, to cut the aſparagus, &c.

Your plot of ground being finiſhed and levelled, you may ſow thereon a ſmall crop of onions, which will not hurt your aſparagus; and tread in your ſeeds, raking your ground level. There are ſome perſons who plant the ſeed of aſparagus in the place where the roots are to remain; which is a very good method, if it be performed with care. The way is this: after the ground has been well trenched and dunged, they lay it level, and draw a line acroſs the ground, in the ſame manner as is practiſed for planting of the young plants; then, with a dibble, make holes at a foot diſtance, into each of which you muſt drop two ſeeds, for fear one ſhould miſcarry; theſe holes ſhould not be more than half an inch deep: then cover the ſeeds, by ſtriking the earth in upon it; and go on, removing the line a foot back for another row; and, after four rows are finiſhed, leave a ſpace for an alley between the beds, if it is deſigned to ſtand for the natural ſeaſon of cutting; but if it is to be taken up for hotbeds, there may be ſix rows planted in each bed; and the diſtance in the rows need not be more than nine inches. This ſhould be performed by the middle of February, becauſe the ſeeds lie long in the ground: but if onions are intended to be ſown upon the ground, that may be performed a fortnight or three weeks after, provided the ground is not ſtirred ſo deep as to diſturb the aſparagus-ſeeds, in raking the onion ſeed into the ground.

As the roots of aſparagus always ſend forth many long fibres, which run deep into the ground; ſo, when the ſeeds are ſown where they are to remain, theſe roots will not be broken or injured, as thoſe muſt which are tranſplanted; therefore, they will ſhoot deeper into the ground, and make much greater progreſs; and the fibres will puſh out on every ſide, which will cauſe the crown of the root to be in the center; whereas, in tranſplanting, the roots are made flat againſt the ſide of the trench.

When your aſparagus is come up, (which will be in three weeks or a month after planting) you muſt, with a ſmall hoe, cut up the weeds, and thin your crop of onions, where they may have come up in bunches; but this muſt be done carefully, and in dry weather, that the weeds may die as faſt as they are cut up. This work muſt be repeated about three times; which, if well done, and the ſeaſon not too wet, will keep the ground clear from weeds, until the onions are fit to be pulled up; which is commonly in Auguſt, and is known when their greens fall down. When you have drawn off your onions, you muſt clean your ground well from weeds; which will keep it clean till you earth your beds, which muſt be done in October, when the haulm begins to decay; for if you cut off the haulm, while green, the roots will ſhoot freſh again, which will greatly weaken them. This young haulm ſhould be cut off with a knife, leaving the ſtems two or three inches above-ground, which will be a guide to you to diſtinguiſh the beds from the alleys; then, with an hoe, clear off the weeds into the alleys, and dig up the alleys, burying the weeds in the bottom; and throw the earth upon the beds, ſo that the beds may be about five inches above the level of the alleys: then you may plant a row of coleworts in the middle of the alleys; but do not ſow or plant any thing upon the beds, which would greatly weaken the roots: nor would I ever adviſe the planting of beans in the alley (as is the practice of many), for it greatly damages the two outſide rows of the aſparagus. In this manner it muſt remain till ſpring, when you muſt hoe over the beds, to deſtroy all young weeds; then rake them ſmooth, and obſerve, all the ſucceeding ſummer, to keep them clear from weeds; and, in October, dig up the alleys again, as was before directed, earthing the beds, &c. The ſecond ſpring after planting, you may begin to cut ſome of your aſparagus, though it will be much better to ſtay until the third; therefore now you muſt fork up your beds with a flat-pronged fork, made on purpoſe, which is commonly called an aſparagus fork: this muſt be done before the buds ſhoot in the ſpring, and with care, leſt you fork too deep, and bruiſe the head of the root; then rake the beds over ſmooth, juſt before the buds appear above-ground; which will deſtroy all young weeds, and keep your beds clean much longer than if left unraked, or done ſo ſoon as forked: and when your buds appear about four or five inches above-ground, you may then cut them; but it ſhould be done ſparingly, only taking the large buds, and ſuffering the ſmall to run up to ſtrengthen the roots; for the more you cut, the more the roots will produce; but they will be ſmaller, and ſooner decay. When you cut a bud, you muſt open the ground with your knife, (which ſhould be very narrow and long in the blade, and filled with teeth like a ſaw) to ſee whether any more young buds are coming up cloſe by it, which might be either broken or bruiſed in cutting the other; then, with your knife, ſaw it off about three inches under-ground. This may appear a troubleſome affair to people unacquainted with the practical part; but thoſe who are employed in cutting aſparagus, will perform a great deal of this work in a ſhort time; but care in doing it is abſolutely neceſſary to be obſerved by all who cut aſparagus.

The manner of dreſſing your aſparagus-beds, is every year the ſame as directed for the ſecond; viz. keeping them from weeds, digging the alleys in October, and forking the beds towards the latter end of March, &c. only obſerve, every other year, to lay a little rotten dung, from a melon or cucumber-bed, all over your beds, burying ſome in the alleys alſo at the time for digging them up. This will preſerve your ground in heart, to maintain your roots in vigour; and, by this management, a plot of good aſparagus may be continued for ten or twelve years in cutting, and will produce good buds. *Miller's Gard. Dict.*

ASPECT, among gardeners, ſignifies the ſame with expoſure. See the article EXPOSURE.

The word is formed from the Latin, *aſpectus*, which is derived from *aſpicio*, to view.

ASPECT, in aſtronomy, denotes the ſituation of the planets and ſtars, with reſpect to each other.

There are five different aſpects. 1. Sextile aſpect is when the planets or ſtars are 60°. diſtant, and marked thus ✶. 2. The quartile, or quadrate, when they are 90°. diſtant, marked □. 3. Trine, when 120°. diſtant, marked △. 4. Oppoſition, when 180°. diſtant, marked ☍. And, 5. Conjunction, when both in the ſame degree, marked ☌.

Kepler, who added eight new ones, defines aſpect to be the angle formed by the rays of two ſtars meeting on the earth, whereby their good or bad influence is meaſured; for it ought to be obſerved, that theſe aſpects being firſt introduced by aſtrologers, were diſtinguiſhed into benign, malignant, and indifferent; the quartile and oppoſition being accounted malign; the trine and ſextile, benign or friendly; and the conjunction, indifferent.

Double ASPECT, in painting, is uſed where a ſingle figure is ſo contrived as to repreſent two or more different objects, either by changing the poſition of the eye, or by means of angular glaſſes.

ASPEN-TREE, in botany, the poplar with trembling leaves. See POPLAR.

ASPER, in grammar, an accent peculiar to the Greek language, marked thus (ʽ) and importing that the letters over which it is placed, ought to be ſtrongly aſpirated, or pronounced, as if an h was joined with them.

ASPER, or ASPRE, in commerce, a Turkiſh coin, three of which make a medine, and worth ſomething more than our halfpenny.

ASPERA *Arteria*, trachea, or wind-pipe, in anatomy, a large canal, partly cartilaginous, and partly membranous, ſituated anteriorly in the lower part of the neck, whence it runs down into the thorax, between the two pleuræ, through the upper ſpace left between the duplicature of the mediaſtinum, behind the thymus.

Having reached as low as the curvature of the aorta, it divides into two lateral parts, one toward the right hand, the other toward the left, which enter the lungs, and are diſtributed through their ſubſtance. Theſe two branches are called bronchia, and that on the right ſide is ſhorter than that of the left; whereas the right pulmonary artery is the longeſt.

The trachea is made up of ſegments of circles or cartilaginous hoops, diſpoſed in ſuch a manner, as to form a canal open on the back part, the cartilages not going quite round; but this opening is filled by a ſoft glandular membrane, which completes the circumference of the canal.

Each circle is about the twelfth part of an inch in breadth, and about a quarter of that ſpace in thickneſs. Their extremities are round; and they are ſituated horizontally above each other, ſmall interſtices being left between them, and the lower edge of the ſuperior ſegments being turned toward the upper edge of thoſe next below them.

They are all connected by a very ſtrong elaſtic membranous ligament fixed to their edges. The firſt three ſegments have been found united into one, bent alternately in two different places, according to its breadth. Sometimes two are continuous in the ſame manner.

The canal of the aſpera arteria is lined on the inſide by a particular membrane, which appears to be partly fleſhy or muſcular, and partly ligamentary, perforated by an infinite number of ſmall holes, more or leſs imperceptible, through which a mucilaginous fluid continually paſſes, to defend the inner ſurface of the trachea againſt the acrimony of the air which we breathe.

This fluid comes from ſmall glandular bodies diſperſed through the ſubſtance of the membrane, but eſpecially from glands ſomething larger than the former, which lie on the outer or poſterior ſurface of that ſtrong membrane by which the circumference of the canal is compleated. The ſame ſtructure is obſervable in the ramifications of the trachea, from the greateſt to the ſmalleſt. *Winſlow's Anatomy.*

The aſpera arteria is, like the arteries of the human body, compoſed of three tunics or coats. Plate VI. *fig.* 2. repreſents theſe membranes ſeparated from each other; *a*, the glandulous membrane; *b*, the vaſculous; *c*, the internal tunic.

ASPERIFOLIATE, or ASPERIFOLIOUS, among botaniſts, ſuch plants as are rough leaved, having their leaves placed alternately on their ſtalks, and a monopetalous flower divided into five parts. The bugloſs, borage, &c. are of this claſs.

The word is formed from the Latin, *aſper*, rough, and *folium*, a leaf.

ASPERITY, the inequality of the ſurface of any body, which hinders the hand from paſſing over it freely.

According to the teſtimony of blind perſons, we have reaſon to believe that every colour hath its particular degree of aſperity.

ASPERULA, woodruffe, in botany, a genus of plants, the flower of which conſiſts of one petal, divided into four ſegments at the limb; its fruit is compoſed of two roundiſh, dry berries, adhering together, in each of which is a ſingle ſeed of the ſame roundiſh ſhape.

The leaves and roots of this plant are eſteemed aperient and diuretic, and conſequently preſcribed in the jaundice, and obſtructions of the viſcera.

ASPHALITES, a term applied by ſome anatomiſts to the fifth vertebra of the loins. See the article VERTEBRÆ.

ASPHALTUM, *Bitumen Judiacum*, or Jews pitch, in natural hiſtory, a ſolid, light, bituminous ſubſtance, found floating on the ſurface of the Dead-ſea, and dug out of the earth in ſeveral parts of Egypt.

It is of a black colour on the outſide, and a deep ſhining black within; of very little taſte, and ſcarcely any ſmell, unleſs heated, when it emits a ſtrong pitchy one. It is not ſoluble either in vinous ſpirits or oils, and melts but imperfectly, and with difficulty, leaving, on being burnt, a large quantity of aſhes.

Abundance of virtues are attributed to this bitumen; but has for many years been diſregarded in this country. The watchmakers uſe a compoſition of aſphaltum, fine lamp-black, and oil of ſpike, or turpentine, for drawing the black figures on dial plates: and the engravers uſe a compoſition, in which aſphaltum is an ingredient, as a ground for their copper-plates, when they etch with aqua-fortis.

ASPHODELUS, aſphodel, in botany, a genus of plants, whoſe flower is liliaceous, conſiſting of a ſingle petal, divided into ſix ſegments; and its fruit is a globoſe-trilocular capſule, containing a number of triangular ſeeds, globular on one ſide.

All the ſorts of aſphodel are very pretty ornaments for a flower-garden; and, requiring very little trouble to cultivate them, are rendered more acceptable. They may be all propagated by ſeeds, which ſhould be ſown ſoon after they are ripe, on a warm border of freſh light earth. In the ſpring the plants will appear, when you ſhould carefully clear them from weeds; and, in dry weather, they muſt be frequently watered: if this be duly obſerved, the plants will have acquired ſtrength enough to be tranſplanted by the Michaelmas following; at which time you muſt prepare a bed of freſh earth in the flower-nurſery, into which you ſhould plant the roots, at about ſix inches diſtance every way; obſerving to plant them ſo low, that the top of the roots may be three or four inches under the ſurface of the bed: in this bed they may remain one year; during which time they ſhould be frequently refreſhed with water in dry weather, and muſt be kept very clear from weeds. In this time the roots, having acquired ſtrength enough to produce flowers the following year, ſhould at Michaelmas, when their leaves are decayed, be carefully taken up, and tranſplanted into the flower-garden; obſerving to place them in the middle of the borders, among other hardy kinds of flowers, where, being properly intermixed, they will make an agreeable variety, and continue a long time in flower.

Theſe plants may alſo be propagated by parting their roots; but this muſt not be too often repeated, leſt it weaken the roots, and prevent their flowering ſo ſtrong as they otherwiſe would do. Once in three years will be often enough to tranſplant the roots; at which times you may ſeparate thoſe which are grown large, ſo as to make two or three roots of each: but do not part them too ſmall; for that will ſo weaken them, as to prevent their flowering the following ſummer. The beſt time to tranſplant theſe roots is at Michaelmas, juſt when their leaves begin to decay. *Miller's Gard. Dict.*

ASPHURELATA, in natural hiſtory, ſemi-metallic foſſils, which are fuſible by fire, but not maleable in the pureſt ſtate. There are five bodies belonging to this claſs of foſſils, each of which makes a diſtinct genus; namely, antimony, biſmuth, cobalt, zinc, and mercury, or quickſilver. See each under its proper article.

ASPIRATE, in grammar, an epithet applied to words marked with an aſper. See Asper.

ASPIRATION, in grammar, the pronouncing a ſyllable with ſome vehemence; as we do in thoſe words which have the letter *h* before them; as *hear*, *heat*, *health*, &c.

ASPIS, or Asp, in natural hiſtory; ſee Asp.

ASPLENIUM, ſpleenwort or miltwaſte, in botany, a ſmall buſhy plant, growing in fiſſures of rocks and old walls; conſiſting of capillary blackiſh roots, and long narrow leaves, cut down to the rib, on each ſide, alternately, into a number of oblong obtuſe narrow ſections, with broad baſes. It has no ſtalk or flower: the ſeeds are a yellow powder produced on the backs of the leaves.

The leaves of ſpleenwort have an herbaceous, mucilaginous, roughiſh taſte, and no conſiderable ſmell: with ſolution of chalybeate vitriol, they ſtrike a blackiſh colour. They ſtand recommended as a pectoral, ſimilar to maidenhair, to which they have been frequently joined in infuſions and apozems; and likewiſe as an aperient in obſtructions of the viſcera. Mr. Morand relates, that there has lately been diſcovered in them an excellent diuretic virtue; that they were uſed with great ſucceſs by count d'Auteuil, a Spaniſh naval commander, againſt the gravel, with which he was violently tormented; that they have ſince come greatly into uſe at Paris, Verdun, and Grenoble; that from the obſervations made there, they appear to gently carry off ſand, cleanſe the kidneys, and allay pains in the urinary paſſages; and that the way of uſing them is, to drink infuſions of them in the morning as tea, with the addition of ſuch other medicines as particular caſes may require.

ASPOLATHUS, in botany, the ſame with acacia. See Acacia.

ASPRE, or Asper. See Asper.

ASS, *Aſinus*, in natural hiſtory, a well known animal, whoſe internal parts and ſkeleton exactly reſemble thoſe of the horſe; but they may be readily diſtinguiſhed from each other by the firſt glance of the eye; for the head is larger in proportion to the body; the ears much longer, and the forehead and temples furniſhed with longer hair; the eyes are not ſo prominent, the lower eye-lid more flat, and the upper lip more pointed and pendent. Beſides, the withers are not ſo high, the back-bone generally ſtands more out, and the buttocks are higher than the withers; add to this, that the tail is without long hair, from the root to about three quarters of its length, tho' it is furniſhed with it at the extremity; the mane likewiſe is ſhorter.

The large head, the forehead and temples are loaded with hair, the eyes ſunk into the head, and at a great diſtance from each other, with the muzzle prominent towards the end, give an air of ſtupidity to an aſs, that never appears in an horſe; nor is the ſhape, when taken all together, by far ſo beautiful as that of this noble animal; his paces likewiſe are quite different, and he is much more ſlow and ſluggiſh. Notwithſtanding all this, the aſs would be of great value, if horſes were not ſo common; and if he was taken as much care of, he would, in all probability, turn out to a much greater advantage than he does at preſent. But we muſt not forget that an aſs is not without ſome good qualities; for he ſeems to know his maſter, and can diſtinguiſh him from all other men, though he has been ever ſo ill treated; he alſo knows the roads he has been accuſtomed to, and can find them without a guide. He has good eyes, a fine ſmell, and an excellent ear. He walks, trots, and gallops like a horſe; but his pace in all other reſpects is much ſlower, and he is ſooner tired. The aſs brays in a very diſagreeable manner; the ſhe aſs has a more ſhrill and piercing cry.

Of all animals that are covered with hair, the aſs is leaſt ſubject to vermin; which may perhaps proceed from the hardneſs and dryneſs of his ſkin; and for the ſame reaſon, he is leſs ſenſible of the ſtrokes of a whip, and the ſtinging of flies, than a horſe. The teeth fall out, and grow at the ſame age, and in the ſame manner as in a horſe, and he has the ſame marks in his mouth. Aſſes generally breed in May and June, and in the tenth month the milk appears in the dugs of the female; but ſhe does not foal till the twelfth month; ſeven days after which, ſhe is ready for the male again. She always brings forth one at a time; at leaſt there are few inſtances to the contrary.

The aſs, like the horſe, is three or four years in growing, and will live till twenty-five or thirty. They ſleep much leſs than a horſe, and never lie down for that purpoſe, unleſs they are very much tired. In general, they have much better health than a horſe, and are ſubject to fewer diſeaſes.

Travellers inform us, that there are two ſorts of aſſes in Perſia, one of which is uſed for burdens, they being ſlow and heavy; and the other, kept like horſes, for the ſaddle; for they have ſmooth hair, carry their heads well, and are much quicker in their motion; but when they ride them, they ſit nearer their buttocks than when on a horſe. They are dreſſed like horſes, and are taught to amble like them; but they generally ſlit their noſtrils to give them more room for breathing. Dr. Ruſſel likewiſe tells us, they have two ſorts in Syria, one of which is like ours, and the other very large, with remarkable long ears; but they are both put to the ſame uſe, that of carrying burdens.

The onager, or wild-aſs, has been, by ſome authors, confounded with the zebra, but very improperly, the latter being a diſtinct ſpecies; for the onager is not ſtreaked like the zebra, nor is his ſhape ſo beautiful. Some have alſo been of opinion, that the wild aſs is not a diſtinct animal from the common aſs; but all judicious travellers that have taken notice of them, affirm the contrary. They are ſaid to be very ſwift; and when they ſee a man, will make a bound, and immediately fly away: ſo that the only method of taking them, is by traps and gins. They have much the ſame ſhape as common aſſes, but are of a brighter colour, and a white liſt runs from the head to the tail. Of the hide of theſe aſſes, and particularly of that part next the rump, they make that excellent leather, which we call ſhagreen, and which is put to ſo many curious uſes.

Asses *Milk*, the milk of the animal deſcribed in the preceding article.

When we examine more minutely into the medicinal virtue and diſpoſition of aſſes milk, it will appear to be poſſeſſed of ſeveral peculiar excellencies, which render it ſo exceedingly wholeſome. In the firſt place it is thinner than all other milks, and abounds with watery and ſerous ingredients.

Since it is known that many diſeaſes are cauſed by a groſſneſs and tenacity of the juices, which, as they paſs ſlowly through the finer veſſels, of which the principal emunctories and ſtrainers of the glands conſiſt, are apt to ſtop in thoſe narrow paſſages, fill them up, and occaſion obſtructions, it is very obvious and natural to conclude, that the uſe of aſſes milk, which abounds with ſerous and fluid particles, muſt be extremely proper to open the obſtructed veſſels, to attenuate the groſs and viſcid juices, and ſet them in an eaſy and free motion. Again, when we know that multitudes of diſtempers proceed from an acrid, ſalt, and corroſive ſtate of the fluids, we cannot but be aſſured that the thin ſerum of aſſes milk will not fail of diluting, ſoftening, and ſubduing them: though it muſt be allowed, at the ſame time, that the ſweet oily ſubſtance contributes much towards this effect, which embraces and involves the pointed particles of ſalt; and by this means the crude ill-digeſted juices, being properly corrected, are, by the plentiful aſſiſtance of ſerum, conveyed in their due courſe through the veſſels appointed for ſecretion.

It is another extraordinary excellence of aſſes milk, that it contains but a ſmall proportion of the groſſer curdling ſubſtance. Not above two drams of a white ſweetiſh matter can be procured from eight ounces of aſſes milk; when, on the contrary, ten drams of curd may be procured from the ſame weight of cows milk. It is therefore evident, that the quantity of the groſs curdling ſubſtance is very ſmall in aſſes milk, when compared with other ſorts. For this reaſon it eaſily diffuſes itſelf into the minuteſt extremities of the blood-veſſels, thoroughly dilutes the vital juices, liquifies the ſluggiſh humours, and, when it has thus diſſolved them, conveys them off.

A third circumſtance that more ſtrongly evinces the ſalubrious quality of aſſes milk, is, that the ſhare of cheeſe-like ſubſtance which it contains, is extremely ſoft and tender, and never makes a groſs or firm curd. To make this evident, ſome aſſes milk was warmed, and ſprinkled with vinegar, in order to ſee if it would contract a thick conſiſtence; but nothing appeared of that ſort, except a few light thin flakes, floating here and there on the ſerum: when, on the contrary, cows milk, the inſtant it was mixed with an acid, condenſed into lumps of a conſiderable hardneſs, and fell to the bottom.

Now in all cures which are ſought by milk, nothing can be ſo hurtful and dangerous as to have it curdle in the ſtomach; to prevent which accident ought to be the phyſician's principal care and concern: for the miſchiefs occaſioned by a coagulation of milk in the ſtomach are very pernicious, and have been obſerved and cautioned againſt by the beſt authors. It is paſt diſpute therefore, that the milk is the moſt wholeſome and proper for medicinal uſes, which has leaſt tendency to curdle, which is the caſe with aſſes milk in the moſt remarkable degree.

A fourth, and a very valuable excellence in aſſes milk, is its exquiſite ſweetneſs, in which it exceeds all other ſpecies of milk, except the human: for you may extract from it a very large quantity of delicate taſted ſugar, or rather a thick ſubſtance reſembling manna, by the following proceſs: Boil twelve ounces of aſſes milk, in the month of July, over a gentle fire, and it will immediately produce a thick concretion very ſweet, weighing one ounce. Upon this, pour it into a glaſs with a pint of rain water, which, on being frequently ſhaken, almoſt diſſolves the maſs, leaving only a ſmall ſediment. The liquor muſt then be poured through filtrating paper, and ſet to evaporate. By this means you will obtain half an ounce of an honey-like ſubſtance, extremely ſweet and white.

As aſſes milk therefore contains ſo plentiful a proportion of ſweet ſalts, we cannot doubt but it has for that reaſon a very ſingular medicinal quality which cannot be expected in other kinds of milk: for this honey-like ſalt greatly ſoftens, checks, and moderates the acrimony of humours, whether acid or bilious; and, by gently irritating the fibres of the bowels, urges them to their office and operations. Hippocrates very juſtly obſerves, that aſſes milk diſpoſes to purging more than any other; and in another place adviſes, as a remedy for the fluor albus, firſt to occaſion a gentle purging by drinking aſſes milk, and then to change it for cows milk.

Hence we ſee the reaſon why ſo much benefit is often found by perſons of a conſumptive habit, from drinking aſſes milk.

ASSA Dulcis, and Foetida. See Asa.

ASSARON, or Omer, a meaſure of capacity, in uſe among the Hebrews, containing five pints.

ASSART, *Aſſertum*, in law, an offence committed in a foreſt, by pulling up the trees by the roots.

This is a greater treſpaſs than waſte; though a perſon may ſue out a licence to aſſart ground in a foreſt; that is, to render it arable: and hence ſome diſtricts are called aſſarted lands; and formerly the owners paid aſſart rents to the crown for them.

ASSASSIN, a perſon who kills another ſecretly, or by attacking his enemy unprepared. It is alſo applied to a perſon who, for the ſake of ſome ſtipulated reward, undertakes to murder a perſon to whom he is a ſtranger, in order to revenge the quarrel of another.

ASSAULT, in law, a violent injury offered to a man's perſon, being of a higher nature than battery; for it may be committed by offering a blow, or pronouncing a terrifying ſpeech.

Thus, in caſe a perſon threatens to beat another, or lies in wait to do it, if the other is hindered in his buſineſs, and receives loſs, it will be an aſſault for which an action may be brought, and damages recovered.

Not only ſtriking, but thruſting, puſhing, throwing ſtones, or even drink in the face of any perſon, are deemed aſſaults. But in all theſe caſes, a man may plead in his juſtification the defence of his perſon or goods, father, mother, wife, maſter, &c.

Assault, in the military art, implies a furious effort made to carry a fortified poſt, camp, or fortreſs, wherein the aſſailants do not ſcreen themſelves behind any works: while the aſſault laſts, the batteries ceaſe firing for fear of killing their own men.

ASSAY, in metallurgy, the trial of the goodneſs and purity of metals and metallic ſubſtances.

Assay *Oven*, or *Docimaſtical Furnace*, a furnace uſed in aſſaying metals.

It is conſtructed in the following manner: 1. Make with iron plates, a hollow quadrangular priſm, H, H, (plate XIV. *fig.* 1.) eleven inches broad, and nine inches high, ending at the top, in a hollow quadrangular pyramid I, ſeven inches high, and terminating in an aperture ſeven inches ſquare. But this priſm muſt be cloſed at the bottom with an iron plate A, which ſerves as a baſis. 2. Near the bottom make a door A, three inches high, and five inches broad, leading to the aſh-hole. 3. Above this, and about ſix inches from the baſe, make another door C, forming the ſegment of a circle, four inches broad at its baſis, and three inches and a half high in the middle. 4. Faſten three iron plates H, H, H, on the fore part of the furnace; let the lowermoſt of theſe plates, which is eleven inches long, and half an inch broad, be faſtened with rivets to the bottom and fore part of the furnace, in ſuch a manner, that there may be a groove ſo wide, between the upper edge of the ſaid plate, and the ſide of the furnace, that the ſliders B, B, of the lower door, may be moved eaſily backwards and forwards therein, by means of the handles O, O: theſe ſliders muſt be made of a thicker iron plate than the other parts of the furnace. The ſecond iron plate muſt be alſo faſtened with rivets in the ſpace between the two doors, and directly parallel to the former, in ſuch a manner, that both the upper and lower edge of it may form a hollow groove with the ſide of the furnace. The lower of theſe grooves ſerves to receive the upper edges of the ſliders B, B, that ſhut the lower door: the upper groove is to receive inferior edges of the ſliders D, D, belonging to the door C. The third plate, which is like the firſt, muſt be riveted cloſe above the upper door, in ſuch a manner, that its lower ſide may form a groove with the ſide of the furnace. 5. Make two ſliders D, D, to ſlide in the above grooves, by means of the handles O, O. In theſe ſliders muſt be two holes near the top; the one, marked E, muſt be about one fifth of an inch broad, and one inch and a half long; the other, marked F, a circular aperture one inch high, and two inches broad. 5. Let five round holes one inch in diameter be bored in the furnace, two in the fore part marked G, G, and two in the back part, all at the height of five inches from the bottom, and each of them three inches and a half from the neareſt ſide of the furnace: and a fifth hole K, at the height of one inch above the top of the upper door C. 7. Let the inſide of the furnace be furniſhed with iron hooks, about three inches from each other, and projecting about half an inch, in order to faſten the lute, with which the inſide of the furnace muſt be covered. 9. Let a moveable hollow quadrangular pyramid M, three inches high, be fitted to the upper aperture L, of the furnace; ſeven inches broad at the baſe, and terminating at top in a circular tube N, three inches in diameter, two inches high, and the upper diameter ſomewhat leſs than the bottom. This prominent tube ſerves to ſupport a funnel or flue, fitted to it, and compoſed of iron plates, two feet high. This funnel is only neceſſary when a very ſtrong fire is required. The pyramidical cover M, muſt have two handles P, P, faſtened to it, in order to put it on, or take it off, as the operation may require. And to hinder this cover from being eaſily thrown down, let an iron plate be riveted to the right and left ſides of the upper part of the furnace, and turned down towards the inſide, ſo as to form a groove, into which the lateral edges of the cover may enter, and ſlide forwards and backwards at pleaſure. A ſquare ledge of thick iron plate muſt be faſtened to the top of the upper ledge of the lower door A, in order to ſupport the grate and lute. The grate muſt be compoſed of ſmall iron bars, half an inch thick, three fourths of an inch diſtant from each other, and placed edgeways on the ledge. The lute muſt be about three quarters of an inch thick, and compoſed of Windſor loam, or French clay, moiſtened with ox blood diluted with water. In order to perform an operation in this oven, two iron bars an inch thick, and of a proper length, muſt be thruſt through the four holes G, G, above deſcribed, in order to ſupport the muffle introduced through the upper aperture of the furnace.

ASSAYING, the art of diſcovering how much pure metal is contained in any ore; or the proportion of the ſeveral ingredients in any mixed metal. For the methods of aſſaying the ſeveral metals, &c. ſee the articles GOLD, SILVER, LEAD, COPPER, &c.

ASSAYING of weights and meaſures, implies the examining the ſeveral weights and meaſures by the clerk of the market.

ASSAY-MASTER, an officer appointed by certain corporations, to make juſt aſſays of all gold and ſilver brought to him for that purpoſe, and make a true report thereof.

ASSEMBLY, in military affairs, implies the ſecond beating of the drum before a march, on which the ſoldiers ſtrike their tents, roll them up, and ſtand to arms.

ASSENT, *Aſſenſus*, in a general ſenſe, implies an agreement to ſomething propoſed or affirmed by another.

Royal ASSENT, the approbation given by the king to a bill in parliament, after which it becomes a law.

ASSIENTO, in commerce, a contract between the king of Spain and ſome other power for tranſporting negroes into the Spaniſh dominions in America.

The word is Spaniſh, and ſignifies a farm.

ASSIGN, in common law, a perſon to whom a thing is aſſigned or made over.

ASSIGNEE, in law, a perſon appointed by another to do an act, tranſact ſome buſineſs, or enjoy a particular thing.

Aſſignees may be appointed either by deed or by law: by deed, where the leſſee of a farm aſſigns the ſame to another; by law, where the law makes an aſſignee without any appointment of the perſon intitled; as an executor is aſſignee in law to the teſtator, and an adminiſtrator to an inteſtate. But when there is an aſſignee by deed, the aſſignee in law is not allowed.

ASSIGNING, in a general ſenſe, implies the making over the right of one perſon to another. In a particular ſenſe, it ſignifies the pointing out of ſomething, as an error, falſe judgment, or waſte: but in theſe caſes it muſt be ſhewn wherein the error is committed, where and how the judgment is unjuſt, and where the waſte is committed.

ASSIGNMENT, in law, the transferring the intereſt one has in a leaſe, or other thing, to another perſon.

ASSISE, in old law books, is defined to be an aſſembly of knights and other ſubſtantial men, together with the juſtice, in a certain place, and at a certain time: but the word in its preſent acceptation, implies a court, place, or time, when and where the writs and proceſſes, whether civil or criminal, are decided by judge and jury.

In this ſenſe, aſſiſe is either general or ſpecial; general, when judges go their reſpective circuits, with commiſſion to take all aſſiſe: ſpecial, when a commiſſion is granted to particular perſons for taking an aſſiſe upon one or two diſſeiſins only.

By magna charta, juſtices ſhall be ſent through every county, once a year, who, with the knights of the ſeveral ſhires, ſhall take aſſiſe of novel diſſeiſin. With regard to the general aſſiſe, all the counties of England are divided into ſix circuits, and two judges are aſſigned by the king's commiſſion to every circuit, who now hold the aſſiſes twice a year, in every county except Middleſex, and the counties palatine. Theſe judges have five ſeveral commiſſions. 1. Of oyer and terminer, by which they are empowered to try treaſons, felonies, &c. 2. Of goal-delivery, which empowers them to try every priſoner in goal, be his offence what it will. 3. Of aſſiſe, which gives them authority to do right upon writs, brought by perſons wrongfully thruſt out of their lands and poſſeſſions. 4. Of niſi prius, by which civil cauſes come to an iſſue in the courts at Weſtminſter, are tried in the vacation by a jury of twelve men, in the county where the cauſe of action ariſes. 5. A commiſſion of the peace in every county of the circuit: and all juſtices of the peace and ſheriffs are to attend upon the judges, otherwiſe they are liable to be fined.

ASSISE is alſo uſed in ſeveral other ſignifications; as 1. For a jury, where aſſiſes of novel diſſeiſin are tried, and the pannels of aſſiſe ſhall be arraigned. 2. For a writ iſſued for the recovery of things immoveable, of which a perſon and his anceſtors have been diſſeized. 3. For an ordinance or ſtatute: thus the aſſiſe of the foreſt is a ſtatute concerning orders to be obſerved in the king's foreſt. 4. For a quantity of wheat, bread, &c. preſcribed by the ſtatute.

ASSISE *of Novel Diſſeiſin*, is a writ that lies where a tenant in fee ſimple, fee tail, or for term of life, is put out and diſſeized of his lands, tenements, rents, common of paſtures, common way, &c.

ASSISE *of Mort d'Anceſtor* is a writ which lies where a perſon's father, mother, brother, &c. died, ſeized of lands and tenements in fee, and after either of their deaths a ſtranger abateth.

ASSISE *of Utrum* lieth for an eccleſiaſtic againſt a layman, or a layman againſt an eccleſiaſtic, for lands or tenements doubtful whether they be lay-fee or free-alms.

ASSIZE. See ASSISE.

ASSOCIATION, the act of aſſociating, or conſtituting ſociety, or partnerſhip, in order to carry ſome ſcheme or affair, with more advantage.

The word is Latin, *aſſociatio*, and compounded of *ad*, to, and *ſocio*, to join.

ASSOCIATION *of Ideas*, is where two or more ideas conſtantly and immediately follow one another, ſo that the one ſhall almoſt infallibly produce the other, whether there be any natural relation between them or not.

When there is a real affinity or connection between ideas, it is the excellence of the mind to be able to collect, compare, and range them in order in its enquiries: but, on the contrary, where there is none, nor any cauſe to be aſſigned for their accompanying each other, but what is owing to mere accident or habit, the aſſociation is unnatural, becomes a great imperfection, and is too often a principal ſource of error or wrong deductions in reaſoning.

Association, in law, is a writ or patent ſent by the king, either of his own motion, or at the ſuit of the plaintiff, to the judges of aſſiſe, to have others aſſociated with them to take the aſſiſe. Upon this patent of aſſociation, the king ſends his writ to the juſtices of aſſiſe, commanding them to admit thoſe that are ſo ſent.

ASSONANCE, in rhetoric and poetry, is where the words of a phraſe or verſe have nearly the ſame ſound, or termination, without making a proper rhyme: theſe are accounted vicious by the generality of critics, though the Romans ſometimes uſed them with elegance.

ASSUMPSIT, in law, a voluntary or verbal promiſe, whereby a perſon undertakes to perform ſome agreement, or pay a certain ſum to another.

Thus, where a man ſells goods to another, the law makes the aſſumpſit; and promiſes he ſhall pay for them.

ASSUMPTION, a feſtival in the Romiſh church, celebrated in honour of the miraculous aſcenſion of the Virgin Mary, body and ſoul, into heaven.

The word is Latin, *aſſumptio*, and compounded of *ad*, to, and *ſumo*, to take.

Assumption, in logic, is the minor or ſecond propoſition in a catagorical ſyllogiſm.

Assumption is alſo ſometimes uſed to imply a conſequence drawn from the propoſitions which compoſe an argument.

ASSUMPTIVE *Arms*, in heraldry, are ſuch as a perſon has a right to aſſume in conſequence of ſome noble and gallant action.

ASSURANCE, or Insurance. See Insurance.

ASSURRITANI, in eccleſiaſtical hiſtory, a ſect of heretics, who made their firſt appearance in Africa during the reign of Conſtantius. They were a branch of the Donatiſts, and held that the Son was inferior to the Father, and the Holy Ghoſt inferior to the Son: they rebaptized thoſe who embraced their ſect; and aſſerted that good men only were within the pale of the church.

ASTAROTH, or Ashtaroth, in antiquity, a goddeſs of the Sidonians.

The word is Syriac, and ſignifies ſheep, eſpecially when their udders are turgid with milk. From the fœcundity of thoſe animals, which in Syria continue to breed a long time, they formed the notion of a deity, whom they called Aſtaroth, or Aſtarte. See Astarte.

ASTARTE, the ſingular of Aſtaroth, a goddeſs of the Sidonians, and called, in Scripture, the Queen of Heaven.

This deity is ſaid to have conſecrated the city of Tyre by depoſiting in it a fallen ſtar: and hence, perhaps, came the notion of a ſtar, or globe of light, which at certain times darted from Mount Libanus, near her temple at Aphac, and plunged itſelf into the river Adonis.

Mr. Fourmont, who has endeavoured to trace moſt of the pagan divinities mentioned in Scripture, ſuppoſes the Sydonian aſtarte or aſtaroth, to be the ſame with the Rachel of the Bible; becauſe the former in the Syriac language implies ſheep, and the latter has the ſame ſignification in the Hebrew.

ASTATI, in eccleſiaſtical hiſtory, a ſect of heretics in the ninth century, the followers of one Sergius, who renewed the errors of the Manichees.

The word is Greek, αϛατοι, and compounded of α, priv. and ιϛημι, to ſtand firm; becauſe they were remarkable for their inconſtancy.

ASTERIA, in natural hiſtory, a beautiful pellucid gem of variable colours, when viewed in different lights. It is generally known among jewellers by the name of cat's-eye. See Cat's-Eye.

Asteria is alſo the name of an extraneous foſſil, called in Engliſh the ſtar-ſtone. See Star-Stone.

ASTERISK, a mark or character in the form of a ſmall ſtar (*) placed over any word or ſentence, to render it more conſpicuous, or refer the reader to the margin, or elſewhere, for a quotation, explanation, or the like.

The word is a diminutive of the Greek, αϛηρ, a ſtar.

ASTERISM, in aſtronomy, the ſame with conſtellation. See Constellation.

ASTERN, in navigation, any diſtance behind a ſhip, or in direct oppoſition to that point of the compaſs which ſhe ſtems, i. e. when north is a-head, ſouth is aſtern.

ASTHMA, in medicine, a painful, difficult, and laborious reſpiration, occaſioned by an intolerable ſtraightneſs of the præcordia, which, by impeding the free circulation of the blood through the lungs, endangers a ſuffocation.

The word is Greek, ασθμα, and derived from αω, to breathe.

There are ſeveral ſorts of aſthmas: one difficulty of breathing proceeds from corpulency, and a very full habit of body; and is moſt apparent after violent motion; but this is a ſlight diſorder, and free from all danger. The next is the pituitous aſthma, attended with a moiſt cough, and the bringing up pituitous matter; it attacks the patient at all hours, and in all poſitions of the body; and is owing to a plenty of a viſcid mucus, ſtuffing the veſiculæ of the lungs, and hindering the free ingreſs and egreſs of the air through them. Another is owing to the convulſive contraction of the parts deſigned for reſpiration, and proceeds from various cauſes, both within and without the thorax; and this is called the dry, flatulent, or convulſive aſthma.

The longer this diſeaſe continues, the more ſharp and violent all the ſymptoms become. The patient's body grows more coſtive, and the urine is thin and watery; moſt commonly the feet ſwell, then the hands, face, and back; there is a numbneſs of the arms; the countenance is wan and livid, or of a leaden colour: then comes on a little fever, which grows worſe in the evening; the whole body is cachectic, with an œdematous ſwelling of the feet; there is a dropſy of the breaſt, or an aſcites, or anaſarca; at leaſt there is a palſy on one ſide, or of the arm; or inſtead thereof, a palſy of the eyelids. This diſeaſe is likewiſe called by ſome, a ſuffocating aſthma; by others the nervous aſthma.

When the diſeaſe is recent, and is owing only to the ſpaſmodic contraction of the præcordia, there are hopes of a cure; eſpecially if the matter of the gout, ulcers, and exanthemata, are ſent back to their proper ſeats. When the menſes or hæmorrhoids, which were ſtopped, return, it yields relief, and if the diſeaſe was not too far advanced, perfect health. If it is inveterate, or ill-managed, it brings on a dropſy of the breaſt, obſtructions of the lower belly, œdematous ſwellings of the feet, a cachexy, and an univerſal dropſy. In general, all convulſive aſthmas portend a ſudden exit, or ſuffocation, eſpecially if there is a polypus of the heart; if it continues long, then the patient will die of the dropſy; in which caſe it will be ſoon fatal: when there is a ſlow fever, an unequal intermitting pulſe, a palſy of the arms, a continual palpitation of the heart, little urine, a ſyncope or ſwooning, then death is at hand. Some are carried off by an inflammation of the lungs, and the more grievous the diſeaſe the more languid the pulſe. The aſthma, in old perſons, continues till death: that which is cauſed by a diſlocation of the vertebræ cannot be cured till they are reduced. The more violent the acceſſion, the longer it laſts, and the oftener it returns with a greater danger of ſuffocation.

In the paroxyſm, becauſe the body is generally bound, and the wind and humours are carried upwards, the ſpeedieſt aſſiſtance is from emollient and carminative clyſters.

If there is occaſion, it may be repeated two or three times: afterwards uſe frictions of the feet, which have an incredible efficacy; alſo let them be put into warm water; for the feet are almoſt always cold. When there is a violent ſpaſm about the præcordia, hot fomentations are neceſſary, or bladders filled with hot milk, and applied to the part affected; likewiſe nervous liniments are very uſeful, rubbed in with a warm hand.

Out of the fit, if it proceeds from too great a congeſtion of blood about the breaſt, or from a polypus of the heart, bleeding in the foot will be proper, as alſo ſcarifications; in a ſuppreſſion of the hæmorrhoids, leeches ſhould be applied to the anus; as alſo gentle laxatives to cleanſe the primæ viæ: likewiſe bodily motion, ſlender diet, and ſoft drink. If there are hypochondriacal or flatulent ſymptoms, then gentle laxatives will be the more neceſſary, together with clyſters. When the menſes or hæmorrhoids are ſuppreſſed, then nothing is better than the bath waters, both for bathing and drinking; or the waters of Selters taken warm and mixed with milk.

When the aſthma proceeds from the driving back ſome impure matter from the ſkin, or from the drying up of ulcers, and the humour is tranſlated to the nervous parts of the breaſt, then gentle diaphoretics will be neceſſary to ſend it back to the ſuperficies of the body.

ASTRÆA, in mythology, the goddeſs of Juſtice. She was the daughter of Jupiter and Themis, and came down from heaven in the golden age; but when the manners of men became corrupt, ſhe left the earth and returned to heaven.

Astræa, in aſtronomy, the ſame as Virgo. See Virgo.

ASTRAGAL, in architecture, a ſmall round moulding, in the form of a ring, ſerving as an ornament at the tops and bottoms of columns.

Sometimes the aſtragal ſerves to ſeparate the faſciæ of the architrave; but then it is wrought in the form of a chaplet, compoſed of beads and berries. It is alſo uſed both above and below the liſts, adjoining immediately to the die or ſquare of the pedeſtal.

Astragal, in anatomy, the bone of the heel, having a convex head, articulated to the tibia by gingly mus.

Astragal, in gunnery, the cornice ring of a piece of ordnance.

ASTRAGULUS, milk-vetch, in botany, a genus of plants with a papilionaceous flower, and a bilocular-podded fruit, containing kidney-ſhaped ſeeds. It is ſaid to be diuretic, and to increaſe the milk of nurſes.

ASTRAL, ſomething belonging to, or connected with, the ſtars.

The word is formed from the Latin, *aſtrum*, which is derived from the Greek, αςηρ, a ſtar.

Astral *Year*, the ſame with ſyderial year. See Year.

ASTRINGENTS, among phyſicians, ſuch medicines as are of an aſtringent or binding quality.

The word is formed from the Latin, *ad*, to, and *ſtringo*, to bind.

Hoffman very judiciouſly obſerves, that aſtringents are very proper to reſtore a tone and elaſticity to the animal fibres, when debilitated by diſeaſes, intemperance, or accident: but they are very ſeldom proper without a previous attenuation of the juices, and a courſe of deobſtruent medicines; becauſe obſtructions are more firmly riveted, and the viſcid juices circulated with more difficulty, when the diameters of the veſſels are conſtricted by aſtringents.

ASTRORITES, the ſtar-ſtone, in natural hiſtory; ſee the article Star-Stone.

ASTROLABE, among the ancients, ſignified the ſame with what we now call an armillary ſphere. See Armillary *Sphere*.

The word is formed from the Greek, αςηρ, a ſtar, and λαμβανω, to take.

Astrolabe is alſo a name for the ſtereographic projection of the ſphere, either on the plane of the equator, or the meridian.

Astrolabe likewiſe implies an inſtrument formerly uſed for taking the altitude of the ſun or ſtars at ſea.

This inſtrument conſiſts of a braſs ring A B C D, (plate VII. *fig.* 6.) the limbs of which are divided into degrees and minutes. A moveable index F G, carrying two ſights, moves upon the center E; and at the zenith, or upper part of the inſtrument, is a ring A, to hang it by in time of obſervation. When you would uſe it, turn the index towards the ſun, that the rays may paſs freely through both ſights, and the fiducial edge of the index will cut the degrees of altitude on the divided limb. This inſtrument has been long laid aſide by navigators, the motion of the ſhip rendering it impoſſible to take altitudes by it to any uſeful degree of accuracy. Indeed the inſtrument called from its inventor Hadley's quadrant, has ſupplied the defects of all others, and is now univerſally uſed at ſea. See *Hadley's* Quadrant.

ASTROLOGICAL, ſomething belonging to aſtrology.

ASTROLOGY, a falacious art, pretending to foretel future events from the ſituation, different aſpects, &c. of the heavenly bodies.

The word is formed from the Greek, αςηρ, a ſtar, and λογος, a diſcourſe.

Aſtrology may be divided into two branches, natural and judiciary; the former being the prediction of natural effects, as the changes of weather, winds, ſtorms, hurricanes, thunder, floods, earthquakes, &c. and the latter that which pretends to foretel moral events, or ſuch as have a dependance on the freedom of the will.

Natural aſtrology belongs to phyſiology, or natural philoſophy, and is only to be deduced a poſteriori from phænomena and obſervations. To this part Mr. Goad chiefly confines himſelf, in his two books of aſtrology, in which he pretends that inundations and an infinite number of phænomena of that kind may be explained from the contemplation of the ſtars. For this aſtrology alſo, Mr. Boyle has a juſt apology in his hiſtory of the air. But as for judicial or judiciary aſtrology, with all the idle conceits about the horary reign of planets, the doctrine of horoſcopes, the diſtribution of the houſes, the calculation of nativities, fortunes, good or bad hours of buſineſs, and the like fatalities, they are mere levities, and may be plainly confuted by phyſical reaſons, and are therefore juſtly rejected by all ſound philoſophers.

ASTRONOMICAL, ſomething relating to aſtronomy.

Astronomical *Calender*, an inſtrument engraved on copper plates, printed on paper, and paſted on a board, with a braſs ſlider carrying a hair, and ſhews by inſpection the ſun's meridian altitude, right aſcenſion, declination, riſing, ſetting, amplitude, &c. to a greater degree of exactneſs than the common globes.

Astronomical *Hours*, the ſame with equal hours, twenty-four of which make a natural day.

Astronomical *Quadrant*, an inſtrument contrived for taking the altitude, &c. of the heavenly bodies, in a very accurate manner. See *Aſtronomical* Quadrant.

Astronomical *Character*.	See	Character.
Astronomical *Month*.		Month.
Astronomical *Obſervation*.		Observation.

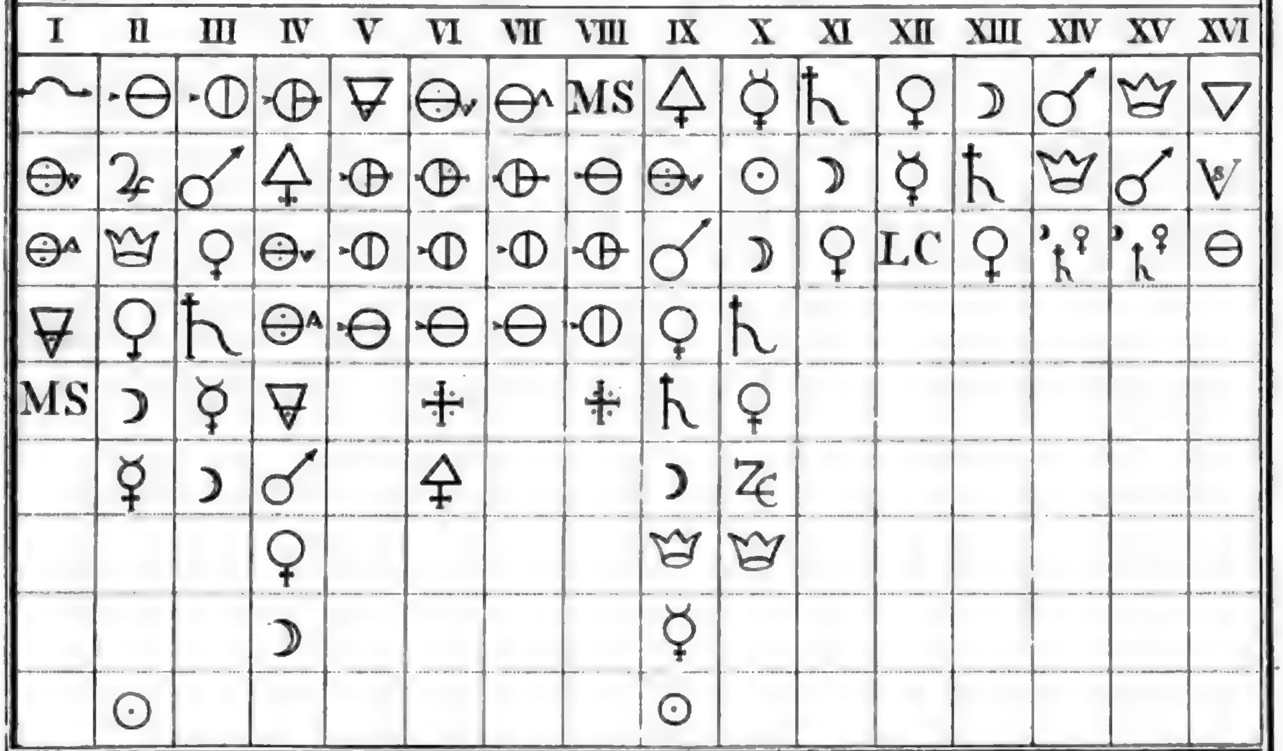
Astronomical *Sector*, a very uſeful mathematical inſtrument, made by the late ingenious Mr. Graham.

It is allowed that a micrometer is the moſt accurate and convenient inſtrument for obſerving the place of a planet or comet, when it happens to be near enough to any known ſtar, by taking the differences of its right aſcenſion and declination from thoſe of the ſtar: but this being frequently impracticable, by reaſon that many large places in the heavens are void of ſtars, whoſe places are known; it is neceſſary to have recourſe to moveable quadrants, or ſextants, furniſhed with teleſcopic ſights, for taking larger diſtances. But beſides the difficulty and charge of procuring good inſtruments of this kind, the great trouble and uncertainties, in obſerving with them, are very notorious, ariſing chiefly from the difficulty the obſervers find in making their obſervations and each teleſcope correſpond together at the ſame inſtant, while the inſtrument is following the diurnal motion of the heavens. The lovers of aſtronomy are therefore much obliged to the late ingenious Mr. George Graham, F.R.S. not only for many uſeful improvements in the mechaniſm of ſeveral aſtronomical inſtruments, but alſo for contriving a very commodious and accurate one for the purpoſe aforeſaid; that is, for taking ſuch differences of right aſcenſion and declination as are too large to be obſerved through a fixed teleſcope; and yet with equal facility and exactneſs too in proportion to the radius of the inſtrument.

Let A B (plate X. *fig.* 16.) repreſent an arch of a circle, containing ten or twelve degrees well divided, having a ſtrong plate C D for its radius, fixed to the middle of the arch at D: let this radius be applied to the ſide of an axis H F I, and be moveable about a joint fixed to it at F, ſo that the plane of the ſector may be always parallel to the axis

Geoffroy's Table of the COMPARATIVE AFFINITIES observed between sundry Substances.

Fig. 1.



I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI
∽	·⊖	·⦶	·⊕	🜃	⊖ᵛ	⊖^	MS	🜍	☿	♄	♀	☽	♂	♕	▽
⊖ᵛ	♃	♂	🜍	·⊕	·⊕	·⊕	·⊖	⊖ᵛ	☉	☽	☿	♄	♕	♂	V
⊖^	♕	♀	⊖ᵛ	·⦶	·⦶	·⦶	·⊕	♂	☽	♀	LC	♀	☽ ♄ ♀	☽ ♄ ♀	⊖
🜃	♀	♄	⊖^	·⊖	·⊖	·⊖	·⦶	♀	♄						
MS	☽	☿	🜃		🜊		🜊	♄	♀						
	☿	☽	♂		🜍			☽	Ƶ						
			♀					♕	♕						
			☽					☿							
	☉							☉							

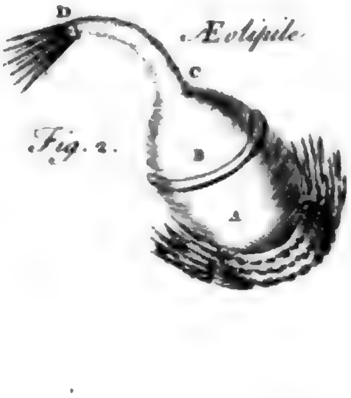
Explanation of the Characters.

∽ Acid Spirits
·⊖ Marine Acid
·⦶ Nitrous Acid
·⊕ Vitriolic Acid
⊖ᵛ Fixed Alkali
⊖^ Volatile Alkali

🜃 Absorbent Earths
MS Metallic Substances
☿ Mercury
♕ Regulus of Antimony
☉ Gold
☽ Silver

♀ Copper
♂ Iron
♄ Lead
♃ Tin
Ƶ Zinc
LC Calamine

△ Sulphur
🜍 Phlogiston
🜊 Spirit of Vinegar
▽ Water
⊖ Neutral Salts
V Ardent Spirits



Æolipile. Fig. 2.

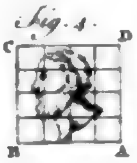
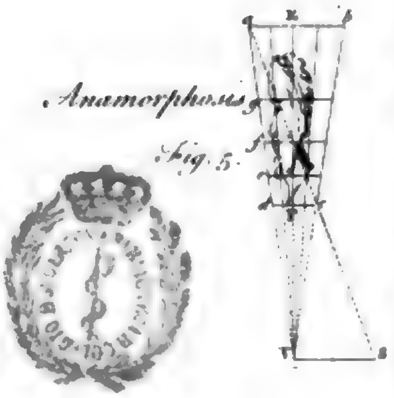
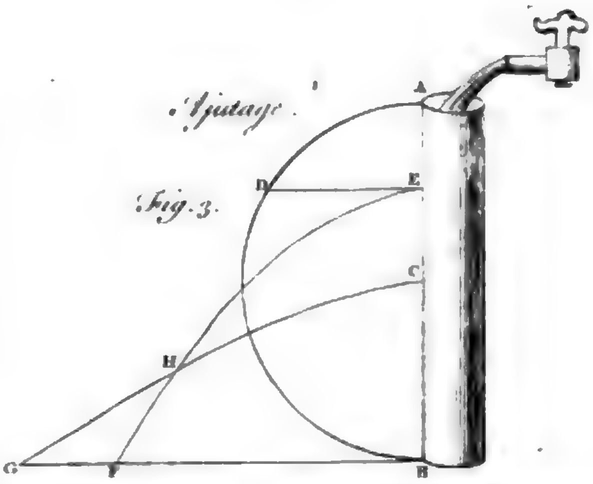


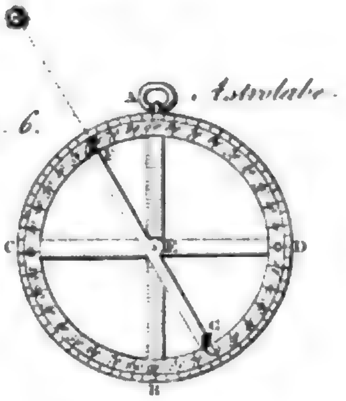
Fig. 4.



Anamorphosis. Fig. 5.



Ajutage. Fig. 3.



Astrolabe. Fig. 6.

axis HI; which being parallel to the axis of the earth, the plane of the ſector will always be parallel to the plane of ſome hour-circle. Let a teleſcope C E be moveable about the center C of the arch A B, from one end of it to the other, by turning a ſkrew at G; and let the line of ſight be parallel to the plane of the ſector. Now, by turning the whole inſtrument about the axis H I, till the plane of it be ſucceſſively directed, firſt to one of the ſtars, and then to another, it is eaſy to move the ſector about the joint F, into ſuch a poſition, that the arch A B, when fixed, ſhall take in both the ſtars in their paſſage, by the plane of it, provided the difference of their declinations does not exceed the arch A B. Then, having fixed the plane of the ſector a little to the weſtward of both the ſtars, move the teleſcope C E by the ſkrew G; and obſerve, by a clock, the time of each tranſit over the croſs hairs, and alſo the degrees and minutes upon the arch A B, cut by the index at each tranſit; then, in the difference of the arches, the difference of the declinations, and by the difference of the times, we have the difference of the right aſcenſions of the ſtars.

The dimenſions of this inſtrument are theſe: the length of the teleſcope, or the radius of the ſector, is $2\frac{1}{2}$ feet; the breadth of the radius, near the end C, is $1\frac{1}{2}$ inch; and at the end D two inches. The breadth of the limb A B is $1\frac{1}{2}$ inch; and its length ſix inches, containing ten degrees divided into quarters, and numbered from either end to the other. The teleſcope carries a nonius or ſubdividing plate, whoſe length, being equal to ſixteen quarters of a degree, is divided into fifteen equal parts; which, in effect, divides the limb into minutes, and, by eſtimation, into ſmaller parts. The length of the ſquare axis H I F is eighteen inches, and of the part H I twelve inches; and its thickneſs is about a quarter of an inch: the diameters of the circles are each five inches: the thickneſs of the plates, and the other meaſures, may be taken at the direction of a workman.

This inſtrument may be rectified, for making obſervations, in this manner: by placing the interſection of the croſs hairs at the ſame diſtance from the plane of the ſector, as the center of the object-glaſs, the plane deſcribed by the line of ſight, during the circular motion of the teleſcope upon the limb, will be ſufficiently true, or free from conical curvity; which may be examined by ſuſpending a long plumb-line at a convenient diſtance from the inſtrument; and by fixing the plane of the ſector in a vertical poſition, and then by obſerving, while the teleſcope is moved by the ſkrew along the limb, whether the croſs hairs appear to move along the plumb-line.

The axis bfo (*fig.* 17.) may be elevated nearly parallel to the axis of the earth, by means of a ſmall common quadrant; and its error may be corrected, by making the line of ſight follow the circular motion of any of the circum-polar ſtars, while the whole inſtrument is moved about its axis, bfo, the teleſcope being fixed to the limb: for this purpoſe, let the teleſcope kl be directed to the ſtar a, when it paſſes over the higheſt point of its diurnal circle, and let the diviſion cut by the nonius, be then noted: then, after twelve hours, when the ſtar comes to the loweſt point of its circle, having turned the inſtrument half round its axis, to bring the teleſcope into the poſition mn; if the croſs hairs cover the ſame ſtar ſuppoſed at b, the elevation of the axis bfo is exactly right; but if it be neceſſary to move the teleſcope into the poſition uv, in order to point to this ſtar at c, the arch mu, which meaſures the angle mfu or bfc, will be known; and then the axis bfo muſt be depreſſed half the quantity of this given angle, if the ſtar paſſed below b, or muſt be raiſed ſo much higher, if above it; and then the trial muſt be repeated till the true elevation of the axis be obtained. By making the like obſervations upon the ſame ſtar on each ſide the pole, in the ſix o'clock hour-circle, the error of the axis, toward the eaſt or weſt, may alſo be found and corrected, till the croſs hairs follow the ſtar quite round the pole: for ſuppoſing $aopbc$ to be an arch of the meridian (or in the ſecond practice of the ſix o'clock hour-circle) make the angle afp equal to half the angle afc, and the line fp will point to the pole; and the angle ofp, which is the error of the axis, will be equal to half the angle bfc or mfu, found by the obſervation; becauſe the difference of the two angles afb, afc, is double the difference of their halves afo and afp. Unleſs the ſtar be very near the pole, allowance muſt be made for refractions.

Astronomical *Tables.* See Tables.

Astronomical *Year.* See Year.

ASTRONOMY, the ſcience which treats of the heavenly bodies; their magnitudes, diſtances, motions, eclipſes, conjunctions, &c.

The word is formed from the Greek, *αϛηρ*, a ſtar, and *νομος*, a law or rule.

Of all the ſciences cultivated by mankind, aſtronomy is acknowledged to be, and undoubtedly is, the moſt ſublime, the moſt intereſting, and the moſt uſeful: for, by the knowledge derived from this ſcience, not only the bulk of the earth is diſcovered, the ſituation and extent of the countries and kingdoms upon it aſcertained, trade and commerce carried on to the remoteſt parts of the world, and the various products of ſeveral countries diſtributed for the health, comfort, and conveniency of its inhabitants; but our very faculties are enlarged with the grandeur of the ideas it conveys, our minds exalted above the low contracted prejudices of the vulgar, and our underſtandings clearly convinced, and affected with the conviction, of the exiſtence, wiſdom, power, goodneſs, and ſuperintendency of the Supreme Being!

From this branch of knowledge we learn by what means or laws the Almighty carries on, and continues the admirable harmony, order, and connexion obſervable throughout the planetary ſyſtem; and are led by very powerful arguments to form the pleaſing deduction, that minds capable of ſuch deep reſearches, not only derive their origin from that adorable Being, but are alſo incited to aſpire after a more perfect knowledge of his nature, and a ſtricter conformity to his will.

By aſtronomy we diſcover that the earth is at ſo great a diſtance from the ſun, that if ſeen from thence it would appear no bigger than a point, although its circumference is known to be 25,020 miles: yet that diſtance is ſo ſmall, compared with the diſtance of the fixed ſtars, that if the orbit in which the earth moves round the ſun were ſolid, and ſeen from the neareſt ſtar, it would likewiſe appear no bigger than a point, although it is at leaſt 162 millions of miles in diameter: for the earth in going round the ſun is 162 millions of miles nearer to ſome of the ſtars at one time of the year than at another; and yet their apparent magnitudes, ſituations, and diſtances from one another ſtill remain the ſame; and a teleſcope which magnifies above 200 times does not ſenſibly magnify them; which proves them to be at leaſt four hundred thouſand times farther from us than we are from the ſun.

It is not to be imagined that all the ſtars are placed in one concave ſurface, ſo as to be equally diſtant from us; but that they are ſcattered at immenſe diſtances from one another through unlimited ſpace: ſo that there may be as great a diſtance between any two neighbouring ſtars, as between our ſun and thoſe which are neareſt to him: therefore an obſerver, who is neareſt any fixed ſtar, will look upon it alone as a real ſun; and conſider the reſt as ſo many ſhining points, placed at equal diſtances from him in the firmament.

By the help of teleſcopes we diſcover thouſands of ſtars which are inviſible to the naked eye; and the better our glaſſes are, ſtill the more become viſible: ſo that we can ſet no limits either to their number or their diſtances.

The ſun appears very bright and large in compariſon of the fixed ſtars, becauſe we keep conſtantly near the ſun, in compariſon of our immenſe diſtance from the ſtars: for a ſpectator placed as near to any ſtar as we are to the ſun, would ſee that ſtar a body as large and bright as the ſun appears to us: and a ſpectator as far diſtant from the ſun as we are from the ſtars, would ſee the ſun as ſmall as we ſee a ſtar, diveſted of all its circumvolving planets; and would reckon it one of the ſtars, in numbering them.

The ſtars being at ſuch immenſe diſtances from the ſun, cannot poſſibly receive from him ſo ſtrong a light as they ſeem to have; nor any brightneſs ſufficient to make them viſible to us: for the ſun's rays muſt be ſo ſcattered and diſſipated before they reach ſuch remote objects, that they can never be tranſmitted back to our eyes, ſo as to render theſe objects viſible by reflection. The ſtars therefore ſhine with their own native and unborrowed luſtre, as the ſun does; and ſince each particular ſtar, as well as the ſun, is confined to a particular portion of ſpace, 'tis plain that the ſtars are of the ſame nature with the ſun.

It is no ways probable that the Almighty, who always acts with infinite wiſdom, and does nothing in vain, ſhould create ſo many glorious ſuns, fit for ſo many important purpoſes, and place them at ſuch diſtances from one another, without proper objects near enough to be benefited by their influences. Whoever imagines they were created only to give a faint glimmering light to the inhabitants of this globe, muſt have a very ſuperficial knowledge of aſtronomy, and a mean opinion of the divine wiſdom; ſince, by an infinitely leſs exertion of creating power, the Deity could have given our earth much more light by one ſingle additional moon.

Inſtead then of one ſun and one world only in the univerſe, as the unſkilful in aſtronomy imagine, that ſcience diſcovers to us ſuch an inconceivable number of ſuns, ſyſtems, and worlds, diſperſed through boundleſs ſpace, that if our ſun, with all the planets, moons, and comets belonging to it were annihilated, they would be no more miſſed out of the creation than a grain of ſand from the ſea-ſhore; the ſpace they poſſeſs being comparatively ſo ſmall, that it would ſcarce be a ſenſible blank in the univerſe; although Saturn, the outermoſt of our planets, revolves about the ſun in an orbit of 4884 millions of miles in circumference, and ſome of our comets make excurſions upwards of ten thouſand millions of miles beyond Saturn's orbit; and yet, at that amazing diſtance, they are incomparably nearer to the ſun than to any of the ſtars, as is evident from their keeping clear of the attractive power of all the ſtars, and returning periodically by virtue of the ſun's attraction.

From what we know of our own ſyſtem, it may be reaſonably concluded that all the reſt are with equal wiſdom contrived, ſituated, and provided with accommodations for rational inhabitants.

To an attentive conſiderer, it will appear highly probable, that the planets, together with their attendants called ſatellites or moons, are much of the ſame nature with our earth, and deſtined for the like purpoſes: for they are ſolid opaque globes, capable of ſupporting animals and vegetables. Some of them are bigger, ſome leſs, and ſome much about the ſize of our earth. They all circulate round the ſun, as the earth does, in a ſhorter or longer time, according to their reſpective diſtances from him; and have, where it would not be inconvenient, regular returns of ſummer and winter, ſpring and autumn. They have warmer and colder climates, as the various productions of our earth require; and in ſuch as afford a poſſibility of diſcovering it, we obſerve a regular motion round their axis, like that of our earth, cauſing an alternate return of day and night, which is neceſſary for labour, reſt, and vegetation, and that all parts of their ſurfaces may be expoſed to the rays of the ſun.

Such of the planets as are fartheſt from the ſun, and therefore enjoy leaſt of his light, have that deficiency made up by ſeveral moons, which conſtantly accompany and revolve about them, as our moon revolves about the earth. The remoteſt planet has, over and above, a broad ring encompaſſing it, which, like a lucid zone in the heavens, reflects the ſun's light very copiouſly on that planet: ſo that if the remoter planets have the ſun's light fainter by day than we, they have an addition made to it morning and evening by one or more of their moons, and a greater quantity of light in the night-time.

On the ſurface of the moon, becauſe it is nearer us than any other of the celeſtial bodies are, we diſcover a nearer reſemblance of our earth: for by the aſſiſtance of teleſcopes we obſerve the moon to be full of high mountains, large valleys, and deep cavities. Theſe ſimilarities leave us no room to doubt but that all the planets and moons in the ſyſtem are deſigned as commodious habitations for creatures endowed with capacities of knowing and adoring their beneficent Creator.

Since the fixed ſtars are prodigious ſpheres of fire, like our ſun, and at inconceivable diſtances from one another, as well as from us, it is reaſonable to conclude they are made for the ſame purpoſes that the ſun is; each to beſtow light, heat, and vegetation, on a certain number of inhabited planets, kept by gravitation within the ſphere of its activity.

What an auguſt! what an amazing conception, if human imagination can conceive it, does this give of the works of the Creator! Thouſands of thouſands of ſuns, multiplied without end, and ranged all around us, at immenſe diſtances from each other, attended by ten thouſand times ten thouſand worlds, all in rapid motion, yet calm, regular, and harmonious, invariably keeping the paths preſcribed them; and theſe worlds peopled with myriads of intelligent beings, formed for endleſs progreſſion in perfection and felicity.

If ſo much power, wiſdom, goodneſs, and magnificence, is diſplayed in the material creation, which is the leaſt conſiderable part of the univerſe, how great, how wiſe, how good muſt he be, who made and governs the whole!

It is not to be doubted but aſtronomy was invented from the beginning of the world. As there is nothing more ſurpriſing than the regularity of thoſe great luminous bodies, that turn inceſſantly round the earth, it is eaſy to judge, that one of the firſt curioſities of mankind was to conſider their courſes, and to obſerve the periods of them. But it was not curioſity only that induced men to apply themſelves to aſtronomical ſpeculations: neceſſity itſelf may be ſaid to have obliged them to it: for if the ſeaſons are not obſerved, which are diſtinguiſhed by the motion of the ſun, it is impoſſible to ſucceed in agriculture. If the times proper for making voyages were not previouſly known, commerce could not be carried on. If the duration of the month and year were not determined, a certain order could not be eſtabliſhed in civil affairs, nor the days allotted to the exerciſe of religion be fixed. Thus, as neither agriculture, commerce, polity, nor religion could diſpenſe with the want of aſtronomy, it is evident that mankind were obliged to apply themſelves to that ſcience from the beginning of the world.

What Ptolomy relates of the obſervations of the heavens, by which Hipparchus reformed aſtronomy almoſt two thouſand years ago, proves ſufficiently, that, in the moſt ancient times, this ſcience was much ſtudied.

It is agreed that aſtronomy was cultivated in a particular manner by the Chaldeans. The height of the tower of Babel, which the vanity of men erected about an hundred and fifty years after the Flood, the level and extenſive plains of that country, the nights in which they breathed the freſh air after the troubleſome heats of the day, an unbroken horizon, a pure and ſerene ſky, all conſpired to engage that people to contemplate the vaſt extent of the heavens, and the motions of the ſtars. From Chaldea aſtronomy paſſed into Egypt, and ſoon after was carried into Phœnicia, where they began to apply its ſpeculative obſervations to the uſes of navigation, by which the Phœnicians ſoon became maſters of the ſea and of commerce.

What made them bold in undertaking long voyages, was their cuſtom of ſteering their ſhips by the obſervation of one of the ſtars of the little bear, which being near the immoveable point of the heavens called the pole, is the moſt proper to ſerve as a guide in navigation. Other nations, leſs ſkilful in aſtronomy, obſerved only the great bear in their voyages: but as that conſtellation is too far from the pole to be capable of ſerving as a certain guide in long voyages, they did not dare to ſtand out ſo far to ſea as to loſe ſight of the coaſts: and if a ſtorm happened to drive them into the ocean, or upon ſome unknown ſhore, it was impoſſible for them to know by the heavens into what part of the world the tempeſt had carried them.

Thales, having at length brought the ſcience of the ſtars from Phœnicia into Greece, taught the Greeks to know the conſtellation of the little bear, and to make uſe of it as their guide in navigation. He alſo taught them the theory of the motion of the ſun and moon, by which he accounted for the length and ſhortneſs of the days, determined the number of the days of the ſolar year, and not only explained the cauſe of eclipſes, but ſhewed the art of foretelling them, which he even reduced to practice, foretelling an eclipſe which happened ſoon after. The merit of a knowledge, ſo uncommon in thoſe days, made him paſs for the oracle of his times, and occaſioned his being given the firſt place amongſt the ſeven ſages of Greece.

Anaximander was his diſciple, to whom Pliny and Diogenes Laertius aſcribe the invention of the terreſtrial globe; or, according to Strabo, geographical maps. Anaximander is ſaid alſo to have erected a gnomon at Sparta, by the means of which he obſerved the equinoxes and ſolſtices, and to have determined the obliquity of the ecliptic more exactly than had ever been done before; which was neceſſary for dividing the terreſtrial globe into five zones, and for diſtinguiſhing the climates, that were afterwards uſed by geographers for ſhewing the ſituation of all the places of the earth. The Greeks, aſſiſted by the inſtructions they had received from Thales and Anaximander, ventured to make conſiderable voyages, and planted ſeveral colonies in remote countries.

Aſtronomy was ſoon ſatisfied for the aſſiſtance ſhe had given to navigation: for commerce having induced the learned of Greece to viſit other nations, they greatly increaſed their knowledge from converſing with the Egyptian prieſts, who had long made the ſcience of the ſtars their profeſſion. They alſo learned many things from the Pythagorean philoſophers in Italy, who had made ſo conſiderable a progreſs in this ſcience, that they had rejected the common opinions, and aſſerted that the earth and planets moved round the ſun, which was at reſt in the center of the ſyſtem.

Meton greatly diſtinguiſhed himſelf at Athens by his profound knowledge in aſtronomy. He lived in the time of the Peloponneſian war; and when the Athenians were fitting out a fleet againſt Sicily, he pretended madneſs, in order to avoid having any ſhare in that expedition, which he was perſuaded would be attended with fatal conſequences. He was the inventor of the golden number, ſtill placed in the calendar.

The Greeks alſo improved their knowledge from converſing with the druids, who, according to Julius Cæſar, inſtructed their pupils in the knowledge of the ſtars, and the magnitude of the heavenly bodies.

This ſpecies of learning was more ancient in Gaul than is generally imagined. Strabo has preſerved a famous obſervation, made by Pytheas at Marſeilles about two thouſand years ago, with regard to the proportion of the ſun's ſhadow to the height of a gnomon at the time of the ſolſtice. Were the circumſtances of this obſervation exactly known, it would be ſufficient to reſolve the important queſtion, Whether the obliquity of the ecliptic be or be not ſubject to variation?

Pytheas was not contented with making obſervations in his own country. His paſſion for aſtronomy and geography induced him to travel through Europe, from the pillars of Hercules to the mouths of the Tanais. He alſo advanced along the ſhore of the weſtern ocean, towards the north pole, and obſerved that the days grew longer about the ſummer ſolſtice, in proportion as he travelled; ſo that, in the iſland of Thule, the ſun roſe almoſt as ſoon as it ſet, the tropic continuing entirely above the horizon. By this means he proved the fallacy of what ſome philoſophers had advanced, namely, that thoſe climates were not inhabitable; and at the ſame time ſhewed the method of diſtinguiſhing the climates by the length of the days and nights.

About the time of Pytheas, ſeveral of the Grecians applied themſelves to aſtronomy in emulation of each other. Eudoxus, the diſciple of Plato, not being ſatisfied with what was taught on that ſubject in the ſchools of Athens, repaired to Egypt, to cultivate aſtronomy at its ſource; and having a letter of recommendation from Ageſilaus king of Sparta, to Nectanebus king of Egypt, he remained ſixteen months with the aſtronomers of that country. At his return he compoſed ſeveral books upon aſtronomy, and, among others, a deſcription of the conſtellations, which Aratus, ſome time after, turned into verſe, by order of Antigonus.

Ariſtotle, at once the diſciple of Plato, and the cotemporary of Eudoxus, made uſe of aſtronomy for improving phyſics and geography. He attempted to determine, by means of aſtronomical obſervations, both the figure and magnitude of the earth. He demonſtrated, that it was of a ſpherical form by the circular appearance of its ſhadow on the diſk of the moon in eclipſes, and from the inequality of the meridian altitudes of the ſun, which are different in different latitudes.

Calliſthenes, who attended Alexander the Great, having been ſent to Babylon, found there aſtronomical obſervations, made by the Babylonians during the ſpace of nineteen hundred and three years, and ſent them to Ariſtotle.

The princes who ſucceeded Alexander in the kingdom of Egypt, were very careful to draw the moſt famous aſtronomers to their courts, by their liberality; ſo that Alexandria ſoon became the ſeat of aſtronomy. The famous Conon made a vaſt number of obſervations; but they have not reached our hands. Ariſtyllus and Timochares obſerved the places of the fixed ſtars, in order to improve navigation and geography. Eratoſthenes meaſured a degree of the meridian, in order to determine the magnitude of the earth. Hipparchus, who alſo reſided at Alexandria, laid the foundation for a methodical ſyſtem of aſtronomy; for a new ſtar happening to appear, he made a catalogue of the fixed ſtars, conſiſting of two thouſand and twenty-two. He alſo deſcribed their motion round the poles of the ecliptic, and at the ſame time applied himſelf to eſtabliſh a theory of the ſolar and lunar motion.

The Romans, who aſpired to the empire of the world, encouraged aſtronomy, and endeavoured to carry it nearer to perfection; and in the reign of Antoninus it began to aſſume a new face: for Ptolemy, who may be called the reſtorer of this ſcience, improving from the lights of his predeceſſors, and adding the obſervations of Hipparchus, Timochares, and thoſe of the Babylonians to his own, compoſed a ſyſtem of aſtronomy, entitled, “The Great Syntaxis.” It contained the theory and tables of the motion of the ſun, moon, and other planets, and of the fixed ſtars.

But as the beginnings of great works are never perfect, it is no wonder that Ptolemy's work was not free from errors and defects. Many ages, however, elapſed without any one's preſuming either to correct or complete it. At laſt the Arabian princes, having conquered the countries where aſtronomy had long flouriſhed, procured the work of Ptolemy to be tranſlated into their own language, and called it the Almageſt. Nor did they ſtop here; they cauſed many obſervations to be made, by which it appeared, that the greateſt declination of the ſun was one-third of a degree leſs than what Ptolemy had made it; and that the motion of the fixed ſtars was not ſo ſlow as he believed it. They alſo ordered a large extent of country under the ſame meridian to be meaſured, in order to determine the length of a degree.

This example of the caliphs excited the princes of Europe to promote the improvement of aſtronomy. The emperor Frederic the ſecond, willing that the Chriſtians ſhould underſtand aſtronomy as well as the Barbarians, cauſed the Almageſt of Ptolemy to be tranſlated from the Arabic into Latin; and Alphonſo, king of Caſtile, aſſembled the moſt able aſtronomers from all parts. By his orders they applied themſelves to reform aſtronomy, and compoſe new tables, which from him were called the Alphonſine Tables.

This work awaked the curioſity of the learned of Europe; they applied themſelves to invent inſtruments for facilitating the obſervations of the heavenly bodies; they calculated ephemerides, and compoſed tables for finding the declinations of the planets; and laboured ſucceſsfully to facilitate the calculation of eclipſes. The noble Dane Tycho Brahe was a far more accurate obſerver than any that preceded him. He publiſhed from his own obſervations, a catalogue of 770 fixed ſtars; and Nicholaus Copernicus revived the ancient Pythagorean ſyſtem.

John Kepler, a moſt excellent aſtronomer, diſcovered, by the help of Tycho's labours, the true ſyſtem of the world, and the laws that regulate the motions of the celeſtial bodies. Galileo, the Florentine philoſopher, firſt directed a teleſcope to the heavens, and by the aſſiſtance of that inſtrument diſcovered a great many new and ſurprizing phænomena, as the ſatellites of Jupiter, and their motion, the various phaſes of Saturn, the increaſe and decreaſe of the light of Venus, the mountains and uneven ſurface of the moon, the ſpots of the ſun, and the revolution of that luminary about its own axis.

Hevelius has given us a catalogue of the fixed ſtars, much larger than that of Tycho, compoſed from his own curious obſervations. Huygens and Caſſini firſt ſaw the ſatellites of Saturn, and diſcovered his ring. The indefatigable Mr. Flamſteed watched the motion of the ſtars for more than forty years; and has obliged the world with ſuch accurate obſervations on the motions, &c. of the different luminaries, as will tranſmit his name to the lateſt poſterity; he alſo publiſhed what is called the Britannic catalogue of fixed ſtars, containing above three thouſand ſtars, from his own obſervations.

The immortal Sir Iſaac Newton, beſides his other innumerable and amazing inventions, diſcovered the fountain and ſpring of all the celeſtial motions, and the law which the great Author has infuſed through the whole ſyſtem, and commanded all bodies to obſerve; namely, that all the particles of matter attract one another in a reciprocal duplicate proportion of its diſtance.

This law may be conſidered as the cement of nature, the principle of union, which preſerves every thing in its proper ſtate and order; it detains not only the planets, but even the comets within due bounds, and hinders them from making too large incurſions into the immenſe regions of ſpace.

To the ſame genius we are alſo obliged for the diſcovery of the law that regulates all the heavenly motions, and ſets bounds to the planets orbs. He ſhewed us the cauſe why ſuch a conſtant and regular proportion is obſerved by both primary and ſecondary planets, in their circulations round their central bodies, in comparing their diſtances with their periods; and why all the celeſtial motions are ſtill continued in ſuch amazing regularity, harmony, and order.

The great Dr. Halley has obliged the world with the aſtronomy of comets, a catalogue of the ſouthern ſtars, aſtronomical tables, &c.

Other aſtronomical writers are, Albategnius, Sacro Boſco, Regio Montanus, Purbachius, Lanſbergius, Longomontanus, Clavius, Boyer, Dr. Hook, Ricciolus, Horrox, Sir Jonas Moore, Tacquet, Bullialdus, Seth Ward, count Pagan, Wing, Street, De la Hire, Dr. Gregory, Mercator, Whiſton, Dr. Keil, the two Caſſini's, Leadbetter, Hodgſon, Brent, Dr. Long, the Abbe le Caille, Wright, Ferguſon, De la Lande, &c.

ASTRONOMY is ſometimes divided into the *old* and the *new*.

The Old ASTRONOMY is that which ſuppoſes the earth fixed and quieſcent in the center, and that the heavenly bodies perform their revolutions round it. This hypotheſis is followed by Ptolemy in his Almageſt, and thence called the Ptolemaic Syſtem. See the article PTOLEMAIC *Syſtem*.

The New ASTRONOMY is that which has been generally followed ſince the time of Copernicus, who revived the Pythagorean or true ſolar ſyſtem. See COPERNICAN *Syſtem*.

ASTROSCOPE, the name of an inſtrument compoſed of two hemiſpheres, having the conſtellations delineated on their ſuperficies.

The word is formed from the Greek, *αςηρ*, a ſtar, and *σκοπεω*, to view.

ASTYNOMI, in antiquity, magiſtrates at Athens, whoſe office was the ſame with that of the ædiles at Rome. See ÆDILE.

ASYLUM, a ſanctuary, a place of refuge, or protection.

Servius derives the word from the privative *α*, and *συλαω*, to draw out; becauſe no perſon could be taken by force from an aſylum.

Some pretend, the firſt aſylum in Greece was that eſtabliſhed by order of the oracle of Jupiter Dodonæus, which commanded the Athenians to grant their lives to all thoſe who fled for refuge into the Areopagus, or to the altars of the goddeſſes. But others ſay, the firſt aſylum was built at Athens by the Heraclidæ, and was a refuge for thoſe who fled from the oppreſſion of their fathers. The aſyla of altars and temples were very ancient in the time of Pauſanias, who writes, that Neoptolemus, the ſon of Achilles, was ſlain near the altar of Apollo at Delphi, as a juſt puniſhment for his having killed Priam, king of Troy, who had fled to the altar of Jupiter Hercules for refuge. The temple of Diana at Epheſus was the moſt famous aſylum. Strabo tells us, that ſeveral princes allowed it, ſome a greater, others a leſs extent of ground beyond the temple itſelf: and Herodotus tells us, there was a temple of Hercules in Egypt, to which bondſlaves fled; who, after they had taken upon them the badges of that god, could not be retaken by their maſters: for the privileges of the aſyla were inviolable; whence Tacitus complains that the Grecian temples were filled with the worſt of ſlaves, with inſolvent debtors, and criminals who fled from juſtice, and that no authority was ſufficient to force them from thence.

This privilege began to be enjoyed by the Chriſtian churches about the time of Conſtantine; but whether that prince made any laws concerning it, is doubted by learned men; for none appear that are older than the time of Theodoſius. At firſt, only the altar and inward fabric of the church was a place of refuge; but afterwards any outer buildings, or precincts of the church, had the ſame privilege granted them; ſuch as the houſes or lodgings of the biſhop and clergy, gardens, baths, courts, and cloyſters; and, in after-ages, this exemption was extended to the graves and ſepulchres of the dead, to croſſes, ſchools, monaſteries, and hoſpitals. This privilege, originally, was not intended to patronize wickedneſs, or ſcreen the guilty from juſtice; but as a refuge for the innocent, the injured, and the oppreſſed; or, in doubtful caſes, to give men protection, till they might obtain an equitable and fair hearing: in all ſuch caſes they were allowed thirty days protection. But that no one might expect this indemnity who had not a juſt and legal title to it, ſeveral crimes and caſes were excepted by law, for which the church could grant no protection: at firſt, protection was denied to public debtors, who had either embezzled, or kept back by fraud, the public revenues of the ſtate. Secondly, to Jews, who pretended to turn Chriſtians only to avoid paying their debts, or ſuffering legal puniſhment for their crimes; in other caſes, they had the common benefit of ſanctuary with other men. The third ſort of perſons to whom this privilege was denied, were heretics and apoſtates; the fourth, ſlaves who fled from their maſters: and the fifth, robbers, murderers, conſpirators, raviſhers, adulterers, and other criminals of the like nature. This ſhews, that the original intention of ſanctuaries in the Chriſtian church was only to protect the innocent and injured; and, in dubious caſes, to grant the ſuppoſed offender a little reſpite. The conditions upon which protection was granted, were, firſt, not to fly with arms to the church; ſecondly, to raiſe no clamour or tumult in flying thither; and thirdly, not to eat, or lodge, in the church, but to be entertained in ſome outward building.

Modern ſanctuaries are a great abuſe of theſe ancient aſyla of the Chriſtian church, in giving protection to almoſt all ſorts of criminals, and ſo enervating the force of civil laws. The canon-law of Gratian, and the decretals of the popes, grant protection to all criminals, except houſe-breakers, highwaymen, and ſuch as commit enormous crimes in the church itſelf, upon preſumption of its protection. Polydore Virgil cenſures the Engliſh for granting protection to all ſorts of criminals, not excepting traitors and rebels: but at preſent we have no ſuch practice; nor is any privileged place, or ſanctuary, in England, allowed, by law, to ſcreen offenders from juſtice.

ASSYMMETRY, the want of proportion between the parts of any thing; being the oppoſite to ſymmetry.

The word is Greek, and compounded of *α*, priv. *συν*, and *μετρον*, meaſure.

It is ſometimes uſed by mathematicians to ſignify incomprehenſibility, or when there is no common meaſure between two quantities or magnitudes.

ASYMPTOTES, in geometry, are ſtraight lines which conſtantly approach nearer and nearer to the curve they are ſaid to be aſymptotes of: but if they and their curve are indefinitely continued, they will never meet; or aſymptotes are tangents to their curves at an infinite diſtance.

Two curves are alſo ſaid to be aſymptotical, when they continually approach to one another, but if infinitely continued, can never meet; as two parabolas that have their axes placed in the ſame right line, are aſymptotical to each other.

Of curves of the firſt order, that is, the conic ſections, only the hyperbola has aſymptotes, being two in number.

All curves of the ſecond order have at leaſt one aſymptote; but they may have three: and all curves of the fourth order may have four aſymptotes. The conchoid, ciſſoid, and logarithmic curve, have each one aſymptote. See Ciſſoid, Conchoid, Curve, Hyperbola, &c.

ASYMPTOTIC, ſomething relating to aſymptotes.

ASSYNDETON, in grammar, a figure which omits the conjunctions in a ſentence.

The word is Greek, and compounded of *α*, priv. and *συνδεω*, to bind together.

ATARAXY, a term uſed by the ſtoics and ſceptics to denote that calmneſs of mind which ſecures us from all emotions ariſing from vanity or ſelf-conceit. In this conſiſted the ſummum bonum, or ſovereign good.

The word is Greek, *αταραξια*, and compounded of *α*, priv. and *ταραξος*, perturbation.

ATAXY, in a general ſenſe, the want of order: with phyſicians it ſignifies the irregularity of criſes and paroxyſms of fevers.

The word is Greek, *αταξια*, and compounded of *α*, priv. and *ταξις*, order.

ATCHE, in commerce, a ſmall ſilver coin uſed in Turky, and worth only one-third of the Engliſh penny.

ATCHIEVEMENT, in heraldry, denotes the arms of a perſon, or family, together with all the exterior ornaments of the ſhield, as helmet, mantle, creſt, ſcrolls, and motto, together with ſuch quarterings as may have been acquired by alliances, all marſhalled in order.

ATE, in the pagan theology, the goddeſs of miſchief.

She was the daughter of Jupiter, and caſt down from heaven at the birth of Hercules: for Juno having deceived Jupiter, in cauſing Euriſtheus to be born before Hercules, Jupiter expreſſed his reſentment on Ate, as the author of that miſchief, and threw her headlong from heaven to earth, ſwearing ſhe ſhould never return thither again.

The name of this goddeſs comes from *αταω*, *noceo*, to hurt. Her being the daughter of Jupiter means, that no evil happens to us, but by the permiſſion of Providence; and her baniſhment to earth denotes the terrible effects of divine juſtice among men.

ATELLANÆ, in Roman antiquity, comic and ſatyric pieces preſented on the theatre; but as in the later times they grew exceſſively lewd, they were ſuppreſſed by order of the ſenate.

A TEMPO Giusto, in muſic, ſignifies to ſing or play in an equal, true, and juſt time.

ATHAMADULET, the prime miniſter of the Perſian empire, as the grand vizier is of the Turkiſh empire.

The athamadulet is great chancellor of the kingdom, preſident of the council, ſuperintendant of the finances, and is charged with all foreign affairs.

ATHANASIAN Creed, that ſuppoſed to be compoſed by Athanaſius. See Creed.

ATHANATI, in Perſian antiquity, a body of cavalry, conſiſting of ten thouſand men, always complete. They were called athanati, becauſe when one of them happened to die, another was immediately appointed to ſucceed him.

ATHANOR, in chemiſtry, a kind of fixed and large digeſting furnace, made with a tower, ſo contrived as to keep a conſtant moderate heat for a conſiderable time, which may be increaſed or diminiſhed at pleaſure, by ſhutting the regiſters.

Plate IX. *fig.* 10. repreſents an athanor furnace, *aaaa*, the tower of the athanor, or chief furnace, which receives the fuel of the fire: the pricked lines indicate the thickneſs of the wall; *bbbb*, the inner ſides which form the cavity, and are each ten inches long; *c*, the door of the aſh-hole; *c*, the upper door; *d*, the grate which is placed even with the bottom of the door *e*; *f*, the cover wherewith the upper aperture of the tower is ſhut; *gg*, a flue, through which the fire aſcends from the tower into the firſt furnace; *hhhh*, a hollow priſm, which forms the firſt ſecondary furnace; *ii*, a ſemi-cylindrical arch, wherewith the aforeſaid priſm is cloſed up; *kkkk*, an iron plate coated within, wherewith the firſt ſecondary furnace is ſhut. In this plate is a round hole, through which the neck of the veſſel 7 may be paſſed; *n*, iron-bars; *oooo*, iron-hooks, faſtened to the wall to receive the iron-bars; *qqqq*, the funnel of the furnace; *z*, an iron plate, wherewith the funnel may be ſhut; *tt*, another flue, through which the fire paſſes from the firſt ſecondary furnace to the ſecond; *uuuu*, another ſecondary furnace cylindrical; *vv*, its upper circular aperture, ſloped at the forepart, to receive an iron pot, which is to be hung in this ſecondary furnace; *z*, a flue, which conveys the fire from the ſecond to the third furnace; 1111, the third ſecondary furnace, having an iron-pot, like the ſecond; 2222, the ſecond funnel; 3, a plate to ſhut the funnel; 4, an aperture which leads from the third furnace into the funnel; 555, the third funnel; 7, an earthen retort, placed in the firſt ſecondary furnace, with its neck through the hole in the door; 8, a receiver; 9, a glaſs retort, placed in the iron pot belonging to the ſecond ſecondary furnace, which pot is filled with ſand; 10, a receiver; 11, a glaſs cucurbit, with its head placed in the pot of the third furnace; 12, 12, ſtands which ſupport the receivers, and which may be raiſed or lowered by the help of ſcrews.

Uſes of the Athanor.—You muſt put in, at the upper arch-door *e*, a ſemi-cylindrical muffle, twelve inches long, of the ſame height and breadth of the door, three quarters of an inch thick, and open behind, being ſhut there by the hinder part of the athanor: for this purpoſe, a tile muſt be placed on the grate *d*, to ſupport the muffle. Under this muffle you may place your cement-pots, or ſuch bodies as muſt be calcined with a long and violent fire; which may be done without a muffle, though not ſo well. In the firſt ſecondary furnace, *hhhh*, *ii*, you may perform the moſt violent diſtillations with an open fire; for retorts and other veſſels may be introduced into it, by taking away the door *kkk*, and placed either upon the hearth itſelf, or on a particular ſupport of ſtone: but you muſt be careful to place thoſe veſſels in ſuch a manner, that their necks may paſs through the hole in the door *kk*. You may cloſe all the crevices of the door with lute. To the neck of the retort apply a cylindrical ſegment ten or twelve inches long, that the heat of the vapours may be gradually diminiſhed, leſt the receiver, which muſt be of glaſs, ſhould ſplit. The receiver muſt be luted to the other orifice of the ſaid ſegment, and ſupported by a kind of trivet. In this chamber, inſtead of diſtillations, you may make cementations, calcinations, &c. in which caſe the round hole in the iron plate *kk*, muſt be ſhut.

The ſecond and third ſecondary furnaces ſerve chiefly to perform ſuch operations as are made in baths of ſand, aſhes, or filings. You may alſo make in theſe furnaces diſtillations by a reverberating fire, as in the firſt; only the fire is leſs violent in theſe, though ſufficient for diſtilling aqua-fortis. In order to this, you muſt take out the iron pot, and invert it on the mouth of the furnace; by this means the ſegment cut out from the pot, together with that cut out from the ſide of the cavity, will form a hole for the neck of the retort.

All the apparatus being thus prepared, you muſt introduce, through the top of the tower *bbbb*, a few burning coals, and then a ſufficient quantity of fuel, ſo that the tower may be entirely filled, or only in part, according to the nature of the operation. Then immediately put on the iron cover *f*, and cloſe exactly all the crevices with lute; for if you neglect this caution, all the fuel contained in the tower would immediately be kindled, which might be attended with very bad conſequences.

Manner of regulating the Fire.—The fire may be made very ſtrong in the firſt chamber *hhhh*, *ii*, by leaving the door of the aſh-hole *c*, and the funnel *qqqq*, of the chamber, quite open, and the fire have free liberty to pa[illegible] from the tower into this cavity: but the cloſer the funnel is ſhut, together with the door of the aſh-hole, the more the violence of the heat diminiſhes; and this will be ſoon effected, if the iron ſlider, which ſeparates this cavity from the tower, be partly let down. Obſerve alſo, when the ſtrongeſt fire is required, that the hole in the door *kk* be cloſely ſtopped; becauſe, when open, the air, by ruſhing violently through it, cools the bodies placed in that cavity. At the ſame time, diſtillation, or ſome other proceſs, may be performed, and with the ſame fire, in the ſecond and third furnaces; for the fire penetrates from the firſt cavity into the ſecond, and increaſes when the funnel 2222, erected on it, is opened: but, before you do this, the funnel of the firſt cavity muſt be ſhut as much as that of the ſecond is opened. By the ſame means you may hinder the fire, which ſerves for the operations made in the two firſt cavities, from going out through their funnels, and force it out through the funnel 555, by which means it will alſo act upon the bodies placed in that cavity: for the more the funnel erected on the third cavity is open, the more one or both the funnels of the other cavities muſt be cloſed: whence it is plain, that you cannot have the ſtrongeſt fire in the third cavity, unleſs there be an equal degree of fire in the other two; but, on the contrary, the heat in the third cavity may be rendered leſs, by cloſing its funnel, though it be violent in the others. The ſame is true of the ſecond cavity, with regard to the firſt. You cannot make the ſtrongeſt fire under the muffle placed within the upper door *e*, of the tower, unleſs you have an equal fire in the firſt cavity; which fire may conſequently be increaſed by ſhutting the door quite againſt the muffle, and diminiſhed by opening it; there being, at the ſame time, an equal heat in the firſt and following chambers.

ATHEIST, a perſon who denies the exiſtence and providence of a God, and conſequently has no religion at all, true or falſe.

The word is formed from the Greek, α, priv. and θεος, God.

There is room to doubt, whether there ever were thinking men, who have actually reaſoned themſelves into the diſbelief of a Deity. Among the ancients, indeed, we read of Theodorus of Cyrene, and Diagoras the Melian, both profeſſed atheiſts; the latter of whom ſet up a ſchool of atheiſm at Athens, for which he was proſecuted by the Athenians; but by flying out of the country, he eſcaped the puniſhment of death intended for him. About twenty years before, they had proceeded againſt Protagoras, another philoſopher, for only doubting of the being of a God. Both theſe had been the ſcholars of Democritus, the firſt founder of the atomical philoſophy, which is in its conſequences an atheiſtical ſcheme: for though it allows the being of a God in name, yet, by denying his providence, it denies his exiſtence in effect. It is however probable, that theſe philoſophers were not, properly ſpeaking, atheiſts, but branded as ſuch by the pagans, for denying the divinity of their falſe gods.

Plato diſtinguiſhes three ſorts of atheiſts: ſuch as deny abſolutely that there are any gods: others who allow the exiſtence of the gods, but deny that they concern themſelves with human affairs, and ſo diſbelieve a providence: and laſtly, ſuch as believe in the gods, and a providence, but think that they are very eaſily appeaſed, and remit the greateſt crimes for the ſmalleſt ſupplication. The firſt of theſe are the only true atheiſts, in the ſtrict and proper ſenſe of the word.

Some diſtinguiſh atheiſts into ſpeculative and practical; by the former they mean ſuch as are atheiſts from principle and theory; and by the latter, thoſe whoſe lives incline them to believe, or rather wiſh to believe, there were no God.

ATHELING, ADELING, EDLING, ETHLING, or ETHELING, among our anceſtors, was a title of honour belonging to the heir apparent, or preſumptive, to the crown. This honourable appellation was firſt conferred by Edward the Confeſſor on Edgar, to whom he was great uncle, when, being without any iſſue of his own, he intended to make him his heir.

ATHENÆA, in antiquity, a feaſt celebrated by the ancient Greeks in honour of Minerva, who was called Athene.

ATHENÆUM, in antiquity, was a public ſtructure, wherein the profeſſors of the liberal arts held their aſſemblies, the rhetoricians declaimed, and the poets rehearſed their performances.

Theſe ſtructures, of which there were ſeveral at Athens, were built in the form of amphitheatres, encompaſſed with ſeats, called cunei.

ATHEROMA, in ſurgery, a tumour without pain, or diſcoloration of the ſkin, containing, in a membraneous bag, matter reſembling pap, intermixed with hard and ſtony particles. Theſe tumours are eaſily cured by inciſion.

The word is Greek, αθερωμα, and derived from αθηρα, pulp, or pap.

ATHLETÆ, in antiquity, perſons of ſtrength and agility, properly diſciplined for performing in the public games.

The word is Greek, αθλητης, and derived from αθλος, combat.

Under the name athletæ were comprehended wreſtlers, boxers, runners, leapers, throwers of the diſcus, and thoſe practiſed in other exerciſes exhibited at the Olympic, Pythian, and other ſolemn games, where prizes were eſtabliſhed for the conquerors.

ATHWART, in navigation, a-croſs; as athwart hawſe, a ſhip is ſaid to lie in that poſition when ſhe bears with her ſide againſt another's ſtem.

ATHWART *the Fore-foot*, is a ſhot generally ſo directed to ſtop a ſhip, and make her remain with her ſails ſlackened, till ſhe is examined; and is levelling the ſhot ſo that it may fall directly under the prow or ſtem.

ATHWART *Ships*, reaching from one end of the ſhip to the other.

ATLANTIDES, in aſtronomy, the ſame with Pleiades. See PLEIADES.

ATLAS, in anatomy, the name of the firſt vertebræ of the neck, or that which ſupports the head. It has its name from an alluſion to a celebrated mountain in Africa, of ſo ſtupendous a height, that it ſeems to ſupport the heavens; and from the fable, in which Atlas, king of that country, is ſaid to bear the heavens on his ſhoulders.

ATLAS, in architecture, is a name given to thoſe whole or half figures of men, ſometimes uſed inſtead of columns or pilaſters to ſupport any member in architecture. They are ſometimes called Telamones.

ATLAS, in matters of literature, denotes a book of univerſal geography, containing maps of all the known parts of the world.

ATMOSPHERE, in phyſiology, the vaſt body or collection of air that ſurrounds the earth to a very conſiderable height.

The word is formed from the Greek, ατμος, a vapour, and σφαιρα, a ſphere.

Height of the ATMOSPHERE.—The modern naturaliſts have been very ſollicitous to determine the height of the atmoſphere; a problem very difficult to be ſolved, becauſe of the elaſticity of the air, which renders its denſity different at different altitudes from the earth's ſurface: for the lower parts of the air, being preſſed by the weight of the ſuperior parts, muſt approach nearer to each other; and this approximation will be proportional to the weight of the incumbent air; whence it follows, that the denſity of the air is greateſt at the earth's ſurface, and decreaſes upwards in a geometrical progreſſion to the altitudes taken in arithmetical progreſſion.

It muſt alſo be obſerved that the rarity of the air cannot proceed *ad infinitum*, but has its limit from gravity: for though the rarefaction of the air be ſtill greater, as its diſtance from the ſurface of the earth increaſes, its ſpring at length will be ſo weakened, that the force by which the particles tend upwards from thoſe next below them, will be leſs than the force of gravity, by which they tend downwards; conſequently the rarefaction of the atmoſphere muſt be bounded where thoſe oppoſite forces are equal to each other.

Were the atmoſphere of an equal denſity throughout, the height of the atmoſphere might be eaſily determined; for it has been found, by experiment, that the length of a column of air ſeventy-two feet high, is equal in weight to a column of water of the ſame baſe, and one inch in height; conſequently the denſity of air is to that of water as 1 to 864. It has alſo been found, by experiment, that the weight of a column of air extending to the top of the atmoſphere, is equal in weight to a column of water of the ſame baſe, and 32 feet or 384 inches high. If therefore we multiply 864 by 384, we ſhall have 331776 inches, or ſomething above five miles, for the height of the atmoſphere, provided its denſity was every where the ſame.

But ſince the denſity of the atmoſphere decreaſes with the preſſure, it will be more rarefied and expanded the higher we go; and therefore the altitude of the atmoſphere becomes indefinite, terminating in pure æther. One principal effect of the air, however, being the refraction of light, whoſe particles are the ſmalleſt of any we know of in nature, it is reaſonable to fix the boundary of the atmoſphere in the altitude where it begins to have the power of producing this leaſt effect in nature, viz. the refracting a ray of light.

In order to make this plainer, let the ſun's rays coming in the direction sab (plate XVIII. *fig.* 1.) enlighten a ſegment of the atmoſphere, repreſented by the ſhaded ſegment $abga$, and terminated below by the line ab, touching the earth's ſurface at d, and above by the arch agb. From the end b, oppoſite to the ſun, draw a line be, touching the earth at another point e; and, ſuppoſing no refraction of the rays, a ſpectator at e might juſt perceive a faint light in his horizon eb, reflected to him from the air or vapours at b. Let the ſpectator be carried, by the earth's annual rotation, from e to f, and his horizon be, into the poſition gf, cutting db in h; and from f he will ſee the part bgh of the luminous ſegment $bgab$, by rays reflected in every poſition from every point of it. And laſtly, when the earth has carried him to d, the whole luminous ſegment $agba$, will become viſible to him, together with the ſun in his horizon da.

From this conſideration the ancient mathematicians determined the height of the atmoſphere to be about 50 miles. As ſoon as they perceived the firſt and fainteſt light on the eaſtern horizon eb, they obſerved the altitudes or poſitions of ſome of the brighteſt ſtars; and thence computed how many degrees the ſun was then below the horizon, and found them at a medium to be about 18. This being the meaſure of the angle dbm, between the two horizons db, eb, produced to m, or between their perpendiculars cd, ce, drawn from the earth's center, they rightly concluded, that the enlightened vapours at b, were ſituated in the line cb, which biſects the ſaid angle dce of 18 degrees. Now, in the right-angled triangle cdb, the radius cd is to cb, the ſecant of the angle $dcb = 9$ deg. as $cf = 10000$ to $cb = 10125$, or as 4000 to 4050. Since, therefore, if the earth's ſemidiameter cf, be about 4000 miles, we have $fb =$ to 50 miles, the height of the vapours at b above the earth's ſurface; ſuppoſing, as we before obſerved, that the horizontal rays db, be, were not refracted.

But ſince the rays AB, BA, De, do each of them ſuffer a refraction inwards the curves DF, Fe, thoſe rays will be repreſented by the dotted lines DG, eH, and the utmoſt height of the reflective matter I, above the earth's ſurface, will be reduced to about 44 miles and an half, according to the following rule, given by Dr. Halley in the Philoſophical Tranſactions, N°. 181.—From the aforeſaid angle dce, of 18 deg. ſubtract twice the uſual refraction of an horizontal ray, or about one degree, and half the remainder will give the angle $dcb = 8$ deg. 30 min. and conſequently, by the ſame proportion, the height of the atmoſphere, fb, will be 44.4 miles; or 44 miles and a half nearly.

Preſſure of the ATMOSPHERE.—It has been already obſerved, that the weight of a column of air, extending to the boundary of the atmoſphere, is equal to the weight of a column of water of the ſame baſe, and 32 feet high; and hence the weight of any part, or of the whole atmoſphere may be determined: but this fluid is ſo ſubject to change, that it is hardly poſſible to find an equal quantity of air at different times, in the ſame place, of equal weight.

This variation is very apparent when there is any alteration in the meteors in the air: for rain, ſudden fierce ſhowers, fogs, hail, ſnow, lightning, thunder, winds from various quarters, ſtorms, whirlwinds, drought, &c. are certain indications that the atmoſphere will ſoon become of a different weight. The different ſeaſons of the year alſo produce an almoſt incredible variation.

Hence an infinite number of effects, depending on the action of the gravity of the air, are in a perpetual viciſſitude and inconſtancy. Accurate obſervations, however, continued almoſt a century, have at laſt enabled us to determine the greateſt and leaſt gravity of the air known in Europe: for it has been found that the greateſt weight of the atmoſphere is in equilibrio with 31 inches of mercury in the barometer, while the leaſt is only equal to 27; ſo that the difference is almoſt a tenth part of its greateſt weight; and between thoſe limits the variation of the atmoſphere's weight is included. We may therefore take 29 inches for the mean altitude of the mercury, and conſequently its weight for the mean weight of a column of air of the ſame baſe. See AIR.

Hence the difference of preſſure on the body of a man, allowing it to contain $14\frac{1}{2}$ ſquare feet, will be nearly equal to 3980 pounds troy. This remarkable difference muſt greatly affect the animal functions, and conſequently our health. If a perſon, for inſtance, be aſthmatical, he will find his diſorder increaſe with the levity of the air; for ſince a pure, denſe, elaſtic, air, is alone capable of diſtending his lungs in reſpiration, it will be leſs capable of performing the ſame office, when its weight and elaſticity are decreaſed; and conſequently the valetudinarian will find his difficulty of breathing increaſe in proportion.

It is common to conſider the air as heavieſt in foggy weather: but the contrary is true; for the air is actually heavieſt in fine clear weather. The reaſon for this error flows from our miſtaking the cauſe. When the fibres and nerves are braced and conſtringed by the great preſſure of the air, the blood veſſels act with their full power and natural vigour, a proper velocity is given to the fluids, and a greater momentum to overcome obſtructions in the capillaries. Hence we find ourſelves alert and light, and thence fancy that the air is light alſo.

On the contrary, when this preſſure is leſſened by near 3980 pounds, the fibres are relaxed, the contractile force of the veſſels diminiſhed, a languid circulation enſues, obſtructions, &c. happen, and produce agues, fevers, aches, &c. in ſome; and in all, a ſort of indolence, or gloomy inactivity, and heavineſs; conſequences which we imagine reſult from the heavineſs of the air; whereas they, in reality, flow from its levity.

Refractive Power of the ATMOSPHERE.—Beſides other innumerable conveniences we receive from the atmoſphere, it is a principal cauſe of rendering our earth that beautiful ſcene it now appears. It is the atmoſphere that makes the face of the heaven or firmament appear lucid and bright while the ſun ſhines; for if no atmoſphere ſurrounded and involved the earth, only that part of the heavens in which the ſun was placed, would appear to ſhine; and a ſpectator, if he ſhould turn his back to the ſun, would immediately perceive it as dark as night; and even in the day-time, while the ſun ſhined, the leaſt ſtars would be ſeen as plainly as in the darkeſt night, becauſe there would be no ſubſtance to reflect the ſun's rays to our eyes; and all the rays that do not fall upon the ſurface of the earth paſſing by us, would either illuminate the planets and ſtars, or ſpreading themſelves out in infinite ſpace, would never be reflected back to us.

But ſince there is an atmoſphere ſurrounding the earth, which is ſtrongly illuminated by the ſun, it reflects the light back to us, and cauſes the whole heavens to ſhine with ſuch ſplendor, as to obſcure the faint light of the ſtars, and render them inviſible.

If there were no atmoſphere, the ſun would ſhine as bright as at noon juſt before his ſetting, and the moment he was below the horizon, the whole face of the earth would be involved in as pitchy darkneſs as at midnight. The ſame phænomena would alſo attend the ſun's riſing. But how inconvenient muſt ſuch ſudden tranſitions from the greateſt darkneſs to the greateſt light, prove to the inhabitants of the earth? This inconvenience is removed by the atmoſphere; for though after ſun-ſetting we receive no direct light from the ſun, yet we enjoy his reflected light for a conſiderable time: ſo that the darkneſs of the night comes on gradually. In the morning alſo, as ſoon as the ſun comes within 17 deg. 30 min. of the horizon, he begins again to enlighten the atmoſphere, and to diffuſe his light through the heavens; its brightneſs continuing to increaſe by degrees, till the ſun riſes, and makes full day.

ATMOSPHERE *of the Moon.*—Sir Iſaac Newton mentions an atmoſphere of the moon, while others are perſuaded there is no ſuch thing, becauſe it cannot be perceived. But if we ſuppoſe the moon's denſity to be the ſame with that of the earth, and to have anequal proportion of fluids, the height of the atmoſphere, ſuppoſing that planet to have one, would be ſo ſmall, that it could not be perceived by the niceſt obſerver. It will be allowed that the height of the atmoſphere will be in proportion to the velocity of the moon round its axis, and the quantity of fluids on its ſurface. The velocity of the moon round its axis is leſs than the twenty-ſeventh part of the velocity of the earth round its axis; and the quantity of fluids on the ſurface of the moon will be leſs than the twelfth part of the quantity of fluids on the ſurface of the earth; conſequently the height of the atmoſphere of the moon muſt be very little in compariſon of the height of the atmoſphere of the earth. Suppoſing the atmoſphere of the earth to be 50 miles, which is much too great, the height of the atmoſphere of the moon would be leſs than the ſixth part of a mile; which, if viewed from the earth, would ſubtend an angle leſs than the ſixth part of a ſecond.

The reaſon aſſigned by ſome aſtromoners for alledging that the moon has no atmoſphere is, that if the moon had an atmoſphere, the planets and ſtars which are often ſeen near its limb, (and ſometimes the moon paſſes over them) would have their light refracted. But it ſhould be obſerved that, during the tranſit of the moon over a planet or fixed ſtar, the time of the tranſit of the atmoſphere of the moon would be leſs than the third part of a ſecond of time; which time is ſo ſmall, that no aſtronomer can pretend to obſerve it. See STEWART's *Diſtance of the Sun from the Earth determined, &c.*

ATMOSPHERE *of the Sun.* See SUN.

ATMOSPHERE *of ſolid,* or *conſiſtent Bodies,* a kind of ſphere formed by the minute corpuſcles, or effluvia, emitted from them.

ATOM, in philoſophy, an indiviſible particle, or corpuſcle of matter.

The word is Greek, ατομος, and compounded of α, priv. and τεμνω, to cut, or divide.

Atoms are properly the *minima naturæ*, the leaſt or ultimate particles into which bodies are diviſible; and are conceived to be the firſt rudiments, or component parts of all phyſical magnitude; or the pre-exiſtent and incorruptible matter whereof bodies are formed.

The notion of atoms ariſes from a ſuppoſition, that matter is not diviſible *ad infinitum.* And hence the Peripatetics are led to deny the reality of atoms; An atom, ſay they, either has parts, or it has not: if it has no parts, it is a mere mathematical point; if it has, theſe parts muſt alſo conſiſt of others, and ſo on to infinity.

But this is to recede from the genuine characters of atoms, which are not eſteemed indiviſible from their want of parts (for all phyſical magnitude muſt have three dimenſions, length, breadth, and thickneſs; and all extenſion is diviſible); but they are indiviſible on account of their ſolidity, hardneſs, and impenetrability, which preclude all diviſion, and leave no vacancy for the admiſſion of any foreign force to ſeparate or disunite them.

It is neceſſary that atoms, as being the firſt matter, ſhould be indiſſolvible, in order to their being incorruptible. Sir Iſaac Newton adds, that immutability is alſo requiſite, in order to the world's continuing in the ſame ſtate, and bodies being of the ſame nature now as formerly.

Hence the ancients were alſo led to maintain that atoms were eternal; for what is immutable muſt be eternal.

ATOMICAL *Philoſophy*, the doctrine of atoms; or the method of accounting for the origin and formation of things from the ſuppoſition of atoms being endued with gravity and motion. See CORPUSCULAR *Philoſophy.*

ATONY, in phyſic, a relaxation, or debility of the ſolids of the human body.

The word is Greek, ατονια, and compounded of α, priv. and τονος, tone.

The Methodic ſect conſidered relaxation and ſtricture, or a mixture of theſe, as the cauſes of all diſtempers.

ATRA BILIS, black bile, among the ancient phyſicians, implied one of the humours of the body; the moderns call it melancholy. See MELANCHOLY.

A-TRIP, in navigation, a ſhip's top-ſails are ſaid to be a-trip when they are hoiſted up to their full extent, or to the maſt-head.

A-TRIP, the anchor is ſo called, when the ſhip, in a perpendicular direction, drags or heaves it out of the ground.

ATROPHY, in phyſic, implies an univerſal conſumption, proceeding from the whole habit of body, and not from any diſtemper of the entrails; it is attended with no remarkable fever, and is natural in old age.

The word is Geeek, ατροφια, and compounded of α, priv. and τρεφω, to nouriſh.

An atrophy is either nervous, or the effect of immoderate evacuations. A nervous atrophy is that which owes its origin to a bad and morbid ſtate of the ſpirits, or to a weakneſs or deſtruction of the tone of the nerves: whence a weakneſs and an univerſal conſumption of the body proceeds, for want of a proper aſſimilation of the nutritious juices; ſo that, from the beginning of the diſeaſe, there is a defect of appetite, and a bad digeſtion in the ſtomach.

An atrophy from inanition proceeds from a preternatural defect or ſubtraction of the nutritious juice, which varies according to the different outlets of the body, whether by nature or art. See CONSUMPTION.

ATTACHMENT, in law, implies the taking or apprehending a perſon, by virtue of a writ or precept.

It is diſtinguiſhed from an arreſt, by proceeding out of a higher court by precept or writ; whereas the latter proceeds out of an inferior court by precept only. An arreſt lies only on the body of a man; whereas an attachment lies often on the goods only, and ſometimes on the body and goods.

An attachment by writ differs from diſtreſs, in not extending to lands, as the latter does; nor does a diſtreſs touch the body, as an attachment does.

In the common acceptation, an attachment implies the apprehenſion of a man's body, in order to his anſwering the action of the plaintiff.

ATTACHMENT *out of the Chancery* is obtained upon an affidavit made, that the defendant was ſerved with a ſubpœna, and made no appearance; or it iſſueth upon not performing ſome order or decree. Upon the return of this attachment by the ſheriff, *quod non eſt inventus in balliva ſua*, another attachment, with a proclamation, iſſues; and if he ſtill refuſes to appear, a commiſſion of rebellion.

ATTACHMENT *of the Foreſt* is one of the three courts held in the foreſt.

The loweſt court is called the court of attachment, or wood-mote court; the mean, ſwan-mote; and the higheſt the juſtice in eyre's ſeat.

The court of attachments has its name from the verdurers of the foreſt having no other authority in it, but to receive the attachments of offenders againſt vert and veniſon taken by the foreſters, and to enroll them, that they may be preſented or puniſhed at the next juſtice in eyre's ſeat.

This attachment is by three means; by goods and chattels, by body, pledges, or mainprize; or by the body only. This court is held every forty-days throughout the year; and is thence called forty-days court.

ATTACHMENT *of Privilege* is by virtue of a man's privilege to call another to that court whereto he himſelf belongs, and in reſpect whereof he is privileged to anſwer ſome action.

Foreign ATTACHMENT is an attachment of money or goods found within a liberty or city, to ſatisfy ſome creditor within ſuch liberty or city.

By the cuſtom of London, and ſeveral other places, a man can attach money or goods in the hands of a ſtranger, to ſatisfy himſelf.

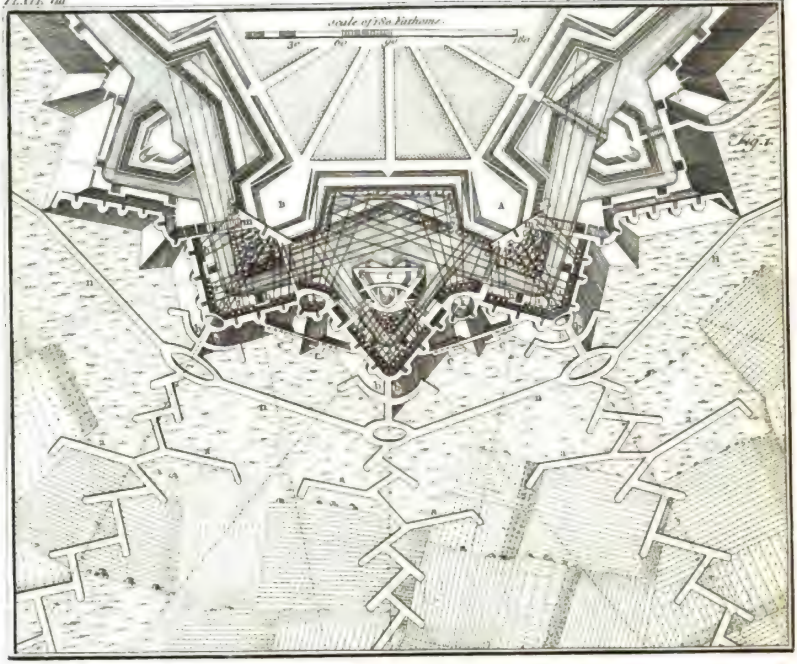

Scale of 180 Fathoms
30
60
90
180
B
A
C
D

Fig. 1.

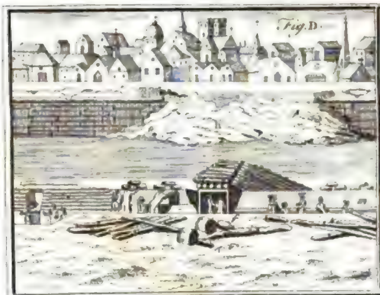


Fig. D.

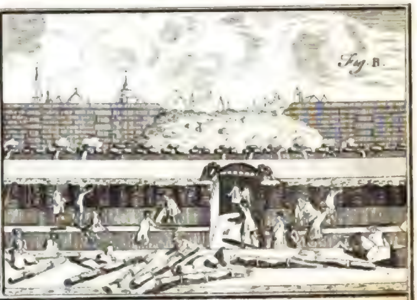


Fig. B.

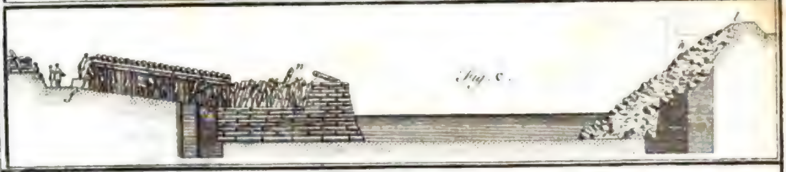


Fig. C.

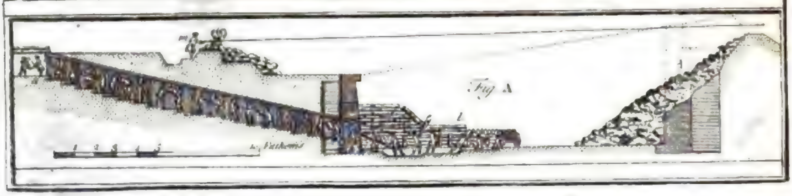

1
2
3
4
5
Fathoms

Fig. A.

Attachiamenta *Bonorum*, in our old ſtatute books, imports a diſtreſs taken upon the goods, or chattels of a perſon ſued for a perſonal eſtate, or debt, by the legal attachiators, or bailiffs, as a ſecurity to anſwer the action.

Attachiamenta *de Spinis & Boſco*, denotes an ancient privilege granted to the officers of foreſts, to take to their own uſe thorns, bruſh, and windfalls within their own precincts or liberties.

ATTACK, a violent attempt upon any perſon or thing, an aſſault, or the act of beginning a combat, or diſpute.

Attack, in the military art, is an effort made to force a poſt, break a body of troops, &c.

Attack *of a Siege*, is a furious aſſault made by the beſiegers with trenches, covers, mines, &c. in order to make themſelves maſters of a fortreſs, by ſtorming one of its ſides. If there are two or three attacks made at the ſame time, there ſhould be a communication betwixt them.

Plate V. *fig.* 2. repreſents an attack of a regular fortification, ſituated in a level country; A, B, baſtions in the front of the attack; C, a half moon in the ſame front; D, D, prolongations of the capitals of A and B; E, a prolongation of the capital of the half moon; F, F, piquets for marking out the lines of prolongation from the capitals, in order to conduct the trenches; G, G, batteries for firing in ricochet againſt the two faces and the covert way of the half moon C; H, a ricochet battery againſt the left face and covert-way of the baſtion A; I, a ricochet battery againſt the right face and covert-way of the baſtion B; K, ricochet batteries againſt the two other faces and covert-way of the baſtions A and B; L, L, ricochet batteries againſt the faces and covert-way of the two collateral half moons M, N; O, O, bomb batteries; P, P, places on the ſecond line for other batteries when neceſſary; R, R, cavaliers of the trenches, which enfilade the covert-way; R, R, ſtands of arms; S, S, picquets on the lines of prolongation from the attacking batteries for placing the pieces in ricochet; T, T, paſſages through the firſt parallel formed of faſcines for carrying cannon to the batteries; V, V, redoubts which terminate the ſecond parallel Y, Y; X, X, firſt parallel, or place of arms; Z, Z, third parallel, or place of arms; *a*, *a*, way of communication between attacks.

Plate VIII. *fig.* 1. repreſents the batteries and lodgments on the covert-way; A, B, baſtions in front of the attack; C, a half moon in the ſame front; *a*, *a*, demi-places of arms; *b*, *b*, cavaliers of the trenches; *c*, *c*, batteries of padereros; *d*, *d*, batteries in breach of the half moon C; *e*, *e*, batteries againſt the faces of the baſtions A and B, which defend the half moon: *f*, *f*, paſſages through the ditch to the half moon; *g*, *g*, lodgments in that work; *h*, *h*, batteries in breach of the baſtions A and B; *i*, *i*, batteries againſt the defences of the baſtions; *k*, *k*, batteries againſt the courtin and the faces of the baſtions; *l*, *l*, paſſages through the ditch to the baſtions; *m*, *m*, lodgments there; *n*, *n*, third parallel or place of arms.

The other figures on the plate repreſent the manner of paſſing the ditch when it is either dry or full of water.

Fig. A is a profil of a deſcent into the ditch by means of a ſort of gallery *a*, formed under the covert-way, and which extends from the counterſcarp *b*, on a level with the bottom of the ditch, to the breach *d*; *m*, the lodgment on the covert-way.

Fig. B, a view of the deſcent from the ſide of the country; *a*, entrance of the gallery; *m*, lodgment on the covert-way; *d*, the breach.

Fig. C. Profil of a deſcent into the ditch when full of water: *f*, *g*, a gallery level with the water, and covered with blinds and faſcines; *n*, the epaulement and bridge made in the ditch for gaining the foot of the breach *b*.

Fig. D, view of the ſame deſcent from the ſide of the country; *f*, the opening at the beginning of the gallery; *m*, lodgment in the covert-way; *b*, the breach.

Falſe Attack, an attack made with a deſign to favour the true attack, by amuſing the enemy, and obliging him to divide his forces.

ATTAINDER, in law, is when a man has committed felony or treaſon, and ſentence is paſſed upon him for the ſame. The children of a perſon attainted of treaſon, are thereby rendered incapable of being heirs to him, or to any other anceſtor; and if he were noble before, his poſterity are degraded and made baſe: nor can this corruption of blood be ſalved, but by an act of parliament, unleſs the ſentence be reverſed by a writ of error.

Attainder is two-fold, either by appearance, or by proceſs.

Attainder by appearance, is either by battle, by confeſſion, or by verdict. By battle, is when the party appealed by another, chooſing rather to try the truth by combat than by jury, is vanquiſhed. Attainder by confeſſion, is either by pleading guilty at the bar, and not putting himſelf upon trial by the jury, or before the coroner in ſanctuary, where, in ancient times, he was obliged to renounce the realm.

Attainder by verdict, is when the priſoner at the bar pleads not guilty to the indictment, and is pronounced guilty by the jury.

Attainder by proceſs, otherwiſe called attainder by default, is where a party flies, or does not appear after being three times publicly called in the county court, and at laſt, upon his default, is pronounced guilty.

Bill of Attainder, a bill brought into parliament for attainting, condemning, and executing a perſon for high treaſon.

ATTAINT, in law, a writ which lies againſt a jury that have given a falſe verdict in any court of record, in a real or perſonal action, where the debt or damages amount to above forty ſhillings.

If the verdict be found falſe, the judgment, by common law, was, that the jurors meadows ſhould be ploughed up, their houſes broken down, their woods grubbed up, all their lands and tenements forfeited, &c. but by ſtatute the ſeverity of the common law is mitigated, where a petty jury is attainted, and there is a pecuniary penalty appointed.

But if the verdict be affirmed; ſuch plaintiff ſhall be impriſoned and fined.

Attaint, among ferriers, a knock or hurt in a horſe's leg, proceeding either from a blow with another horſe's foot, or from an over-reach in froſty weather, when a horſe being rough ſhod, or having ſhoes with long calkers, ſtrikes his hinder feet againſt his fore-legs.

ATTAINTED, in law, is applied to a perſon found guilty of any crime or offence, eſpecially of treaſon or felony, by due courſe of law.

ATTENTION, the applying either the ear or the mind aſſiduouſly to any thing ſaid or done, in order to underſtand it.

The word is Latin, *attentio*, and compounded of *ad*, to, and *tendo*, to ſtretch, or bend.

To increaſe attention, we muſt baniſh every thing that may interrupt it, and ſeek every means to ſtrengthen and aſſiſt it. Our ſenſes are apt to divert our attention; new ſenſations obſcure, efface, and obliterate acts of imagination. Yeſterday you ſaw a fine piece of painting, were ſo ſtruck with it, that its idea quite poſſeſſed you; another, offered to your view to-day, drives the former out of your imagination; thus external objects deſtroy attention: for this reaſon ſome pray with their eyes ſhut, or directed ſteadily towards ſome fixed and immoveable point. Students chooſe a room remote from noiſe and the interruption of external objects; and the ſtudies of the night have been more ſucceſsful than thoſe of the day, becauſe a more univerſal calm and ſilence reigns.

The hurry of the imagination deſtroys attention as much as that of our ſenſes; after a play, it is difficult to reſume our ſtudies immediately; next day ſome images will recur, apt to divert us, and interrupt our attention. The ſenſes, the imagination, and the paſſions operate upon the ſoul, and give it a kind of modification. All, therefore, who would apply themſelves ſtrenuouſly to the diſcovery of truth, ſhould be careful to avoid ſtrong and immoderate ſenſations, a great noiſe, a glaring light, exceſs of grief, or joy, &c. they ought to keep their imagination free from any thing that weakens or diſquiets the mind. They ought, eſpecially, to control their paſſions, which, let looſe, make very powerful impreſſions on the ſoul and body, and exerciſe a ſtrange dominion over both;

yet the paſſions and the ſenſes may be made of uſe to preſerve our attention: as, for inſtance, a deſire of diſcovering truth, rendering ourſelves uſeful to our neighbours, and improving ourſelves, is highly laudable, and tends to fix our attention: but our attention is fixed alſo by motives much leſs generous and noble, a thirſt of fame, deſire of riches, nay, even vanity. Experience ſhews us the ſenſes are of no ſmall ſervice to fix the attention; for they have a natural connection with our ſituation; a man, retired to meditate in a ſolitary cell, will be alarmed, diſtracted, and his attention entirely deſtroyed by an unexpected noiſe, or intermiſſion of adventitious light; ſo, if we, on the contrary, reflect ſtrongly on an object amidſt day-light and noiſe, that idea baniſhes all others and poſſeſſes us; thus light and noiſe are no interruptions to attention, but ſerve to fix it more ſtrongly. It is, in ſhort, a habit of the mind: and the philoſophers, who have ſhut their eyes to help their meditation, have furniſhed us with nothing but chimeras. Had Deſcartes kept his eyes open to have ſurveyed the univerſe with attention, inſtead of ſinking into meditation, he would never have publiſhed ſuch dreams as he has for a plan of the univerſe. Attention is progreſſive, and the power of it may be acquired, but depends, in ſome meaſure, on the conſtitution.

ATTENUANTS, in pharmacy, are medicines which reſolve the viſcocity of the humours in the human body, and thereby promote their free circulation, and, at the ſame time, diſcharge all noxious and excrementitious matter.

The word is formed from the Latin, *ad*, and *tenuo*, to render ſmall.

ATTESTATION, the act of affirming, or witneſſing, the truth of ſomething, eſpecially in writing.

The word is Latin, *atteſtatio*, and compounded of *ad*, to, and *teſtis*, a witneſs.

ATTIC, ſomething relating to Attica, or the city of Athens. Thus, attic ſalt, *ſales attica*, implies a delicate and poignant ſpecies of wit and humour peculiar to the Athenian writers: attic witneſs, *atticus teſtis*, a witneſs incapable of corruption, &c.

Attic, in architecture, a ſort of building; the roof or covering of which is concealed; ſo called from the Athenian buildings, which were in general of this form.

Attic *Order*, in architecture, a ſmall order raiſed upon a large one, by way of crowning, or to finiſh the building.

The word is alſo applied to the whole ſtory, into which this order enters.

Attic *of a Roof*, a kind of parapet to a terras, platform, or the like.

Attic *Continued*, that which encompaſſes the whole circumference of a building, without any interruption, following all the jetts, the returns of the pavilions, &c.

Attic *Interpoſed*, one ſituated between two tall ſtones, ſometimes adorned with columns, or pilaſters.

Attic *Baſe*. See the article Base.

ATTIRE, in botany, a name given by ſome to the generative parts of plants; and by others, to imply the third part or diviſion of the flower of a plant; the other two being the empalement and the foliation, or the cup and the flower petals.

Attire, in hunting, ſignifies the head or horns of a deer. See the article Head.

ATTITUDE, in painting and ſculpture, ſignifies the geſture of a figure or ſtatue; or ſuch a diſpoſition of their parts as ſerves to expreſs the action and ſentiments of the perſon repreſented.

The word is formed from the Italian, *attitudine*, which ſignifies the ſame thing.

ATTOLENS, in anatomy; ſee Levatores and Elevatores.

The word is compounded of the Latin, *ad*, to, and *tollo*, to raiſe.

ATTORNEY, in a general ſenſe, a perſon appointed by another to do ſometing in his ſtead.

The word is formed from the Latin, *ad*, to, and the French, *tourner*, to turn; q. d. to turn a buſineſs over to another.

Attorney *at Law*, one who is retained to proſecute or defend a law-ſuit.

Attornies, being properly thoſe who ſue out writs, or proceſs, or commerce, carry on, and defend actions, in any of the courts of common law, are diſtinguiſhed from ſolicitors, as the latter do the like buſineſs in the courts of equity; and none are admitted, either as an attorney or ſolicitor, unleſs they have ſerved a clerkſhip of five years, been enrolled, and taken the oath in that caſe provided; and the judges of their reſpective courts are required to examine their ſeveral capacities.

By a late order of all the judges, all attornies are to be admitted of ſome inns of court or chancery (except houſe-keepers in London and Weſtminſter, &c.) and no attorney ſhall put himſelf out of that ſociety, into which he is admitted, till he is admitted to ſome other ſociety, and deliver a certificate thereof; and all attornies are to be in common at the times ordered by the ſociety to which they belong, otherwiſe ſhall be put out of the roll of attornies.

Attornies may be puniſhed for ill practices; and if an attorney, or his clerks, of which he muſt have but two at one time, do any thing againſt the expreſs rules of the court, he or they may be committed.

Neither a plaintiff nor defendant may change his attorney without rule of court, while the ſuit is depending; and attornies are not generally obliged to deliver up the writings in their hands, till their fees are ſatisfied: likewiſe, an action does not lie againſt an attorney, for what he adviſes in the way of his profeſſion; yet, if an attorney plead any plea, or appear, without warrant from his client, action of the caſe lies againſt him.

Attornies have the privilege to ſue and be ſued only in the courts of Weſtminſter, where they practiſe; and they ſhall not be choſen into offices againſt their will.

Attorney *of the Dutchy of Lancaſter* is the ſecond officer in that court, and ſeems to be there, for his ſkill in the law, placed as aſſeſſor to the chancellor of the court.

Attorney-General is a great officer under the king, created by letters patent, whoſe office is to exhibit informations, and proſecute for the crown in criminal cauſes; and to file the bills in the exchequer, for any thing concerning the king in inheritance or profits. To him come warrants for making of grants, pardons, &c. his ſalary from the crown is 1000l. per ann.

ATTORNMENT, in law, implies a transfer made from one lord to another, of the homage and ſervice a tenant makes; or that acknowledgment of duty to a new lord.

ATTRACTION, in natural philoſophy, an indefinite term applicable to all actions whereby bodies tend towards one another, whether by virtue of their weight, electricity, magnetiſm, impulſe, or any other latent power.

The word is Latin, *attractio*, and compounded of *ad*, to, and *traho*, to draw.

Philoſophers generally reckon four different ſorts of attraction, viz. that of coheſion, of electricity, of magnetiſm, and gravitation.

Attraction *of Coheſion*, is peculiar to the component particles of bodies, by virtue of which they are firmly connected and held together. The laws and properties of this attraction are the following: 1. It is very diſcernable and moſt powerful in corpuſcles, or the ſmalleſt particles of matter. 2. It is mutually exerted between thoſe particles; or they mutually attract, and are attracted by each other. 3. The ſphere of attraction, or extent of this power, is greater in ſome particles of matter than in others, but very ſmall at the outermoſt: for, 4. this power is inſenſible in ſolid bodies in the leaſt ſenſible diſtance, acting as it were only in contact; and, therefore, 5. it muſt be nearly proportional to the quantity of contiguous ſurfaces; or the parts of the body cohere moſtly ſtrong, whoſe touching ſurfaces are largeſt. 6. This power muſt decreaſe, as the ſquares of the diſtances increaſe; becauſe it muſt be ſuppoſed to iſſue from each particle in right-lined directions. 7. Where the ſphere of attraction ends, there a repelling power begins; by which the particles, inſtead of attracting, repel and fly from each other. 8. By this power, the ſmall portions or drops of a fluid, conform themſelves to a ſpherical figure.

The firſt and ſecond of theſe properties, are evident

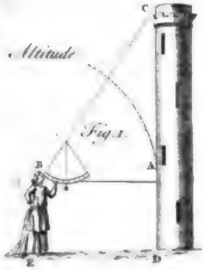


Fig. 1.
Altitude
C
B
A
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D

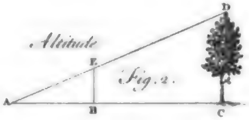
Fig. 2.
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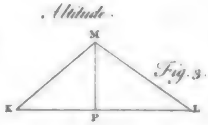
Fig. 3.
Altitude.
M
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P
L

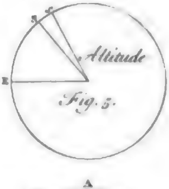
Fig. 5.
S
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Altitude
E

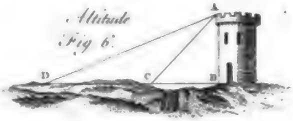
Fig. 6.
Altitude
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D
C
B

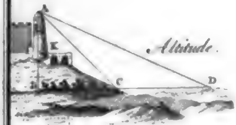
Fig. 4.
A
K
Altitude.
C
D

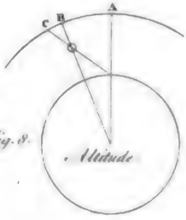
Fig. 8.
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B
A
Altitude

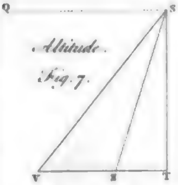
Fig. 7.
Q
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Altitude.
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T

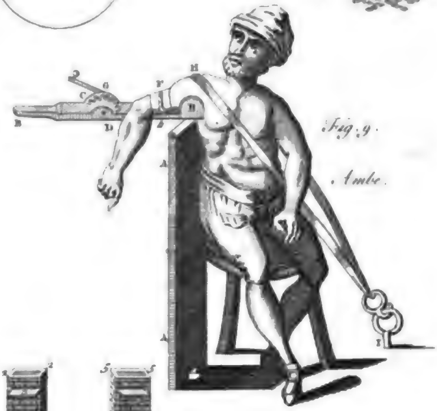
Fig. 9.
Ambe.
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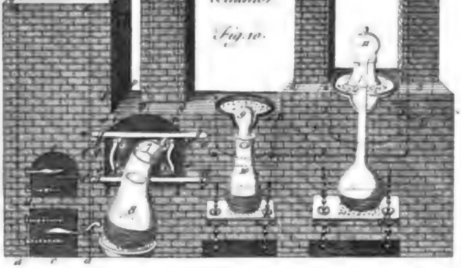
I


Athanor.
Fig. 10.

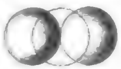


Fig. 11. Attraction.

from various experiments; as the ſudden union of two contiguous drops of mercury, water, &c. Thus the drops, plate IX. *fig.* 11. will, as ſoon as they touch each other, run together, and form one large drop. The ſtrong adheſion of two leaden balls, which touch by poliſhed ſurfaces; as alſo of glaſs panes, and in capillary tubes; the riſing of water by the ſides of a glaſs veſſel, and into tubes of ſand, aſhes, ſugar, ſponge, and all porous ſubſtances.

The third property is proved by the ſticking or adhering of water to ſubſtances, which by mercury are left dry. The fourth and fifth properties are evinced by the hyperbolic curve, formed by the ſuperficies of a fluid aſcending between glaſs-panes touching each other on one ſide. The ſixth property is evident. The ſeventh appears from the aſcent of a ſteam, or vapour, from humid or fluid bodies; and the eighth property is manifeſt by drops of water falling on duſt.

From this account of the attraction of coheſion, we have a rational ſolution of ſeveral very curious and ſurpriſing phænomena; as why the parts of bodies adhere and ſtick ſo firmly together; why ſome are hard, others ſoft; ſome fixed, others fluid; ſome elaſtic, others void of elaſticity: all which ariſe from the different figures of the particles, and the greater or leſſer degree of attraction conſequent thereupon. On this principle, we account for the manner how plants imbibe the nutritive juices by the fibres of the roots; alſo for the riſe of the ſap in vegetables, and for the whole œconomy of vegetation. Hence the rationale of the various ſecretions of fluids by the glands, and their wonderful circulation through the fine capillary veſſels. Hence alſo the reaſon of ſoldering and gilding metals; alſo of melting, or fuſion, by heat. Hence alſo the exhalation of vapour by the heat of the ſun or fire; the aggregation of aqueous particles in the air, forming the drops of rain. We hence ſee the reaſon of diſtillation, filtration, diſſolution, digeſtion, ſublimation, precipitation, cryſtallization, and the other operations of chemiſtry and pharmacy. Laſtly, it is by this power of attraction and repulſion, that we are to account for thoſe wonderful phænomena of ſubterranean aſcenſions and exploſions; of volcanos and earthquakes; of hot ſprings, damps, and ſuffocating exhalations in mines, &c. See the article COHESION.

The ſecond ſpecies of attraction is that of electrical bodies, as glaſs, amber, ſealing-wax, jet, &c. for the properties of which, ſee ELECTRICITY.

For the properties of the third kind of attraction, ſee the articles MAGNET and MAGNETISM.

The fourth kind of attraction, viz. that of gravitation, though reckoned a diſtinct ſpecies from that of coheſion; yet, when well conſidered, may be found perhaps to differ from it no otherwiſe than as a whole from the parts: for the gravity of large bodies may be only the reſult or aggregate of the particular powers of the conſtituent particles, which ſingly act only in contact, and in ſmall diſtances; but with their joint forces, in vaſt quantities, produce a mighty power, whoſe efficacy extends to very great diſtances, proportional to the magnitudes of the bodies.

This attractive force of gravity is, to ſenſe, the ſame for any diſtance near the ſurface of the earth; becauſe ſuch diſtances do not ſenſibly alter the diſtance from the center of the earth: but when the diſtance is ſo great as to bear a conſiderable proportion to the ſemi-diameter of the earth; then will the power of gravity decreaſe very ſenſibly. Thus, at the diſtance of the moon, which is, at a medium, about ſixty ſemi-diameters of the earth, the power of gravity will be to that on the earth's ſurface, as 1 to 3600, as will be ſhewn under the article of CENTRAL FORCES. See alſo the articles GRAVITY and GRAVITATION.

All philoſophers agree that there is a certain force by which the primary planets tend towards the ſun and the ſecondary planets towards their primary. As we ought carefully to avoid multiplying principles, and impulſe is the moſt known and leaſt controverted principle of the motion of bodies, it is clear, a philoſopher would naturally attribute this impelling power to a fluid. To this notion, the vortices of Des Cartes owe their birth, and this opinion ſeemed more plauſible, becauſe it accounted for the motions of the planets by the circular motion of the matter of the vortices, and their tendency towards the ſun by the centrifugal force of the ſame matter: but an hypotheſis is not to be admitted, which accounts only for general phænomena; particular phænomena are the teſts of an hypotheſis, and the failure of the Carteſian ſyſtem in theſe overturned it. The doctrine of vortices is therefore juſtly exploded, as ſo many difficulties attend it which never can be ſurmounted; for, if the planets move by virtue of the action of a fluid, this fluid muſt have contrary properties, it muſt impel in one intention, and in another make no reſiſtance, an apparent abſurdity; and the remedy is worſe than the diſeaſe; for the force by which the planets tend towards the ſun, muſt, on this hypotheſis, be aſcribed to an occult quality, which is ſaying nothing at all: and Ariſtotle, who perhaps invented the term, is much more pardonable than many modern philoſophers who have blindly followed him.

We may therefore truly aſſert, that attraction is a primordial quality of matter; nor is it perhaps poſſible to explain the celeſtial bodies on the principle of impulſion. Sir Iſaac Newton ſeems to waver in ſome parts of his works concerning the nature of attraction, and admits of an impelling power; there is reaſon to think it was a kind of tribute he choſe to pay to the prejudice, or rather the general opinion of the age he lived in, than his real ſentiment; becauſe he permitted Mr. Cotes, his diſciple, to adopt attraction without reſerve, as may be ſeen in the preface to his ſecond edition of his Principia; and this preface was written under the eye of Sir Iſaac, and had his approbation. Beſides, Sir Iſaac admits a reciprocal attraction among the celeſtial bodies, and this very opinion ſeems to ſuppoſe attraction a quality inherent in bodies; but be that as it may, according to Newton, the attractive force decreaſes in an inverſe ratio to the ſquares of the diſtances: this learned philoſopher has ſolved a great part of the celeſtial phænomena on this ſingle principle, and all who have tried to account for them ſince, on the ſame principle, have ſucceeded to a ſurpriſing degree of exactneſs. The motion of the moon's apogee, which was pretended to be irreconcileable to this hypotheſis, is now found to be entirely conformable to it, and does honour to the Newtonian ſyſtem. All the other inequalities of the motion of the moon, which are very conſiderable, may alſo eaſily be accounted for by the ſyſtem of attraction, and demonſtrated by calculation.

All the phænomena hitherto obſerved, demonſtrate a mutual tendency of the planets towards each other; wherefore we muſt admit this for a truth on its own evidence; and, though we ſhould be forced to acknowledge this a primordial and inherent quality in matter, we may venture to ſay, that the difficulty of conceiving ſuch a cauſe would be a very weak argument againſt its exiſtence. No one doubts but that a body which meets another, communicates motion to it; but have we an idea of the power by which this communication is made? The vulgar eye here, perhaps, penetrates as far as that of the philoſopher. No body is ſurpriſed at ſeeing a ſtone fall; they have always ſeen it; philoſophers, well acquainted with the effects of impulſion, have never troubled themſelves about the cauſe which produces them. Now, if every body which meets another ſhould ſtop without communicating motion to it, a philoſopher would be as much aſtoniſhed at this phænomena, as a common man at ſeeing a heavy body ſuſpended in the air. If we underſtood wherein the impenetrability of matter conſiſts, we ſhould not perhaps be clearer about the nature of the impelling power. We only ſee that, in conſequence of this impenetrability, the ſhock of one body againſt another muſt be followed by ſome change, either in both or one of the bodies; but we know not, and perhaps never ſhall, by what power this change is effected; and why, for inſtance, a body which ſtrikes againſt another ſhould not always continue at reſt after the ſhock, without communicating a part of its motion to the body which reſiſts it. It is apprehended attraction contradicts the notion we have of matter; but, if we enquire attentively, we ſhall find theſe ideas no ways repugnant. The univerſe is concealed from us by a curtain, we ſee only ſome part of it; were that drawn up on a ſudden, we ſhould be ſurprized to ſee what paſſes behind it: beſides, the pretended inconſiſtence of attraction, with the nature of matter, is ſolved by admitting an intelligent being, who could as eaſily ordain bodies to act on each other at a diſtance, as in contact.

M. de Maupertuis, in his diſcourſe on the figures of the planets, has given an idea of the ſyſtem of attraction, with remarks on it: and the ſame author obſerves, in the Mem. Acad. 1734, that, long before Sir Iſaac Newton, Roberval de Fermat and Paſcal thought gravity an attractive power, and inherent in bodies. We will add, that Hook had the ſame notion, and foretold that all the motions of the planets would one day be accounted for on this ſingle principle. Theſe reflections, by increaſing the number of great men, who were of the ſame opinion with Sir Iſaac, take nothing from his glory; for, as he was the firſt who actually demonſtrated this principle, he is properly the author of it.

ATTRACTION *of Mountains.* If it be admitted that all parts of the earth attract each other mutually, it muſt be granted that there are mountains on it, whoſe magnitude is conſiderable enough to make a ſenſible attraction. Let us ſuppoſe the earth a globe of an uniform figure, whoſe radius is equal to 1500 leagues, and ſuppoſe a mountain on the ſurface of ſome part of this globe one league in height, it is eaſy to demonſtrate, that a weight placed at the bottom of this mountain ſhall be attracted horizontally by the mountain, with a force equal to a 3000th part of the weight; ſo that a pendulum or plumb-line, placed at the bottom of this mountain, muſt deviate from a perpendicular about a minute; the calculation is not difficult, and this may be admitted by way of ſuppoſition: from whence it follows, that when we obſerve the elevation of a ſtar at the foot of a great mountain; the plumb-line muſt deviate from a perpendicular; and an obſervation of this kind, certainly, would afford a very ſtrong proof in favour of the ſyſtem of attraction: but, it may be objected, how ſhall we be ſure the plumb-line actually deviates from a perpendicular, as the direction of the plumb-line only determines the vertical ſituation of the ſtar? This difficulty is eaſily ſurmounted.

Let us ſuppoſe a ſtar on the north of the mountain, and the perſon who is to make his obſervation placed on the ſouth: if the attraction of the mountain acts ſenſibly on the plumb-line, it will deviate from a perpendicular towards the north; and, conſequently, the apparent zenith of the ſtar will go back towards the ſouth; and ſo the diſtance of the ſtar, on which the obſervation is made in the zenith, muſt be greater than if there was no attraction.

After having made this obſervation, if we go at a diſtance from the mountain, on a right line towards the eaſt or weſt, ſo far that the attraction no longer operates, an obſervation, made in this new ſtation, will ſhew the ſtar at a leſs diſtance than in the former.

But there is another and better method. It is certain, that, if the plumb-line on the ſouth ſide of the mountain deviates towards the north, the plumb-line in the north ſide muſt deviate towards the ſouth, and the zenith of the ſtar, which in the firſt caſe went back towards the north, muſt, in the latter, advance towards the ſouth: therefore, taking the difference of theſe two diſtances, and dividing it into two equal parts, will ſhew how much the pendulum has deviated from a perpendicular by the attraction of the mountain.

The whole theory is clearly explained, with ſeveral remarks, in an excellent Memoir of M. Bouguer's, printed in the year 1749, at the end of his book on the figure of the earth: in which he gives an account of the obſervations he made in company with M. Condamine, on the north and ſouth ſides of the great mountain Chimboraco, in Peru; the reſult of his obſervations is, that the attraction of this great mountain cauſes a deviation of the plumb-line from its perpendicular of $7''$ and a half. Mr. Bouguer judiciouſly remarks, that the greateſt mountain is a trifle coimpared to the vaſt body of the terreſtrial globe; and that a hundred obſervations, where no ſenſible attraction is found, prove nothing againſt the Newtonian ſyſtem; but that this made at the foot of the vaſt mountain Chimboraco, which is in favour of the doctrine of attraction, deſerves the attention of all philoſophers.

ATTRACTIVE, ſomething that has the power or property of attraction.

ATTRACTIVES, or ATTRACTIVE *Medicines*, a name given by ſome writers to what are otherwiſe called *digeſtives*, *drawers*, *&c.*

ATTRIBUTE, in a general ſenſe, implies a quality belonging to ſome perſon or thing. Thus, underſtanding is an attribute of the mind, and extenſion an attribute of body.

The word is Latin, *attributum*, and compounded of *ad*, to, and *tribuo*, to give, or aſcribe.

ATTRIBUTES, in theology, the ſeveral qualities or perfections of the divine nature, which conſtitute his eſſence.

The heathen mythology divided the deity into as many diſtinct beings as he had attributes. Thus the power of God was called Jupiter, the wrath and vengeance of God, Juno, &c. But true religion and ſound philoſophy have taught the world to conſider the ſeveral attributes of God as one entire perfection, which, though it exerts itſelf in different ways and actions, and conſequently admits of divers names, ſuch as wiſdom, goodneſs, mercy, &c. yet is in itſelf but one ſimple indiviſible principle of action, whoſe operations are all uniform and harmonious.

ATTRIBUTES, in logic, are the predicates of any ſubject, or what may be affirmed or denied of any thing.

ATTRIBUTES, in painting and ſculpture, ſignifies the ſymbols added to ſeveral figures to intimate their particular office and character. Thus the eagle is the attribute of Jupiter; a peacock of Juno; a caduce of Mercury; a club of Herculus; a trumpet of Fame; a balance of Juſtice; and a palm of Victory.

ATTRITION, in a general ſenſe, implies the rubbing or ſtriking of bodies one againſt another, ſo as to throw off ſome of their ſuperficial particles.

The word is Latin, *attritio*, and derived from *adtero*, to rub againſt.

The grinding or poliſhing of bodies is performed by attrition, the effects of which are heat, light, fire, and electricity.

ATTRITION is often uſed for the friction of ſuch ſimple bodies as do not wear from rubbing againſt one another; but whoſe fluids are, by that motion, ſubjected to ſome particular determination; as the various ſenſations of hunger, pain, and pleaſure, are ſaid to be occaſioned by the attrition of the organs formed for ſuch impreſſions.

ATTRITION, among divines, ſignifies a ſorrow or repentance for having offended God, ariſing chiefly from the apprehenſions of puniſhment, the loſs of heaven, and the torments of hell; and differs from contrition, inaſmuch as this laſt is conceived to ariſe from a love to God, as an ingredient or chief motive to our ſorrow and repentance. See the article CONTRITION.

AVAUNCHERS, among hunters, the ſecond branches of a deer's horn.

AUBIN, in horſemanſhip, a kind of broken pace, between an amble and a gallop. It is reckoned a defect.

AUCTION, *Auctio*, a kind of public ſale, very much in uſe for houſhold goods, books, plate, &c. By this method of ſale, the higheſt bidder is always the buyer.

This was originally a kind of ſale among the ancient Romans, performed by the public crier, *ſub haſta*, i. e. under a ſpear, ſtuck up on that occaſion by ſome magiſtrate, who made good the ſale by delivery of the goods.

AUDIANISM, the ſame with anthropomorphiſm, or the doctrine of the anthropomorphites. See the article ANTHROPOMORPHITES.

AUDIENCE, in a general ſenſe; ſee the article HEARING.

AUDIENCE given to ambaſſadors, implies the ceremonies obſerved in courts, at the admiſſion of ambaſſadors, or public miniſters, to a hearing.

In England, audience is given to ambaſſadors in the preſence-chamber; to envoys and reſidents, in a gallery, cloſet, or in any place where the king happens to be. Upon being admitted, as is the cuſtom of all courts, they make three bows, after which they cover and ſit down;

but not before the king is covered and ſat down, and given them the ſign to put on their hats.

When the king does not care to have them covered, and ſit, he himſelf ſtands uncovered; which is taken as a ſlight.

At Conſtantinople, miniſters uſually have audience of the grand vizier.

AUDIENCE is alſo the name of a court of Juſtice eſtabliſhed in the Weſt-Indies by the Spaniards, anſwering in effect to the parliament in France.

Theſe courts take in ſeveral provinces, called alſo audiences from the names of the tribunal to which they belong.

AUDIENCE is alſo the name of an eccleſiaſtical court held by the archbiſhop of Canterbury, wherein differences upon elections, conſecrations, inſtitutions, marriages, &c. are heard.

AUDIENDO & TERMINANDO, a writ, or more properly a commiſſion, directed to certain perſons, when any riotous aſſembly, inſurrection, &c. is committed in any place for appeaſing it, and puniſhing the offenders.

AUDIENTES, an order of catechumens, in the primitive Chriſtian church, conſiſting of ſuch as were but newly inſtructed in the myſteries of the Chriſtian religion, and not yet admitted to baptiſm.

AUDIT, a regular hearing and examination of an account by ſome proper officers appointed for that purpoſe.

AUDITA QUERELA, a writ that lies uſually where one is bound in a ſtatute merchant, ſtatute ſtaple, or recognizance, when a perſon has any thing to plead, but hath not a day in a court for pleading it; or where judgement is given for debt, and the defendant's body in execution; then if he have a releaſe, or other ſufficient cauſe to be diſcharged therefrom, but wants a day in court to plead the ſame, this writ may be granted him againſt the perſon that has recovered, or againſt his executors.

This writ is granted by the lord chancellor, upon view of the exception ſuggeſted to the judges of either bench, willing them to grant ſummons to the ſheriffs of the county where the creditor is, for his appearance, at a certain day, before them.

AUDITOR, in a general ſenſe, a hearer, or one who liſtens and attends to any thing.

AUDITOR is alſo uſed for ſeveral officers appointed to audit. See AUDIT.

It was anciently uſed for a judge. Notaries are alſo frequently called auditores.

AUDITOR, according to our law, is an officer of the king, or ſome other great perſon, who, by examining yearly the accounts of the under-officers, makes up a general book, with the difference between their receipts and charges, and their allowances or allocations.

AUDITOR *of the Receipts* is an officer of the exchequer who files the tellers bills, makes an entry of them, and gives the lord-treaſurer a certificate of the money received the week before. He alſo makes debentures to every teller before they receive any money, and takes their accounts. He keeps the black-book of receipts, and the treaſurer's key of the treaſury, and ſees every teller's money locked up in the new treaſury.

AUDITORS *of the Revenue*, or *of the Exchequer*, officers who take the accounts of thoſe who collect the revenues and taxes raiſed by parliament, and take the accounts of the ſheriffs, eſcheators, collectors, tenants, and cuſtomers, and ſet them down in a book and perfect them.

AUDITORS *of the preſt and impreſt*, are officers of the exchequer, who take and make up the account of Ireland, Berwick, the Mint, and of any money impreſſed to any man for the king's ſervice.

AUDITORS *Collegiate*, *Conventual*, *&c.* officers formerly appointed in colleges, &c. to examine and paſs their accounts.

AUDITORY, ſomething relating to the ſenſe of hearing. See the article HEARING.

AUDITORY, or AUDIENCE, an aſſembly of people who attend to hear a perſon that ſpeaks in public.

AUDITORY is alſo uſed for the bench whereon a magiſtrate or judge hears cauſes.

AUDITORY was alſo the place in ancient churches where the congregation ſtood to hear ſermons.

Meatus AUDITORIUS, auditory paſſage, in anatomy; ſee MEATUS *Auditorius*.

AUDITORY *Nerves*, in anatomy, a pair of nerves ariſing from the medulla oblongata, with two trunks, the one of which is called the portio dura, or hard portion, the other portio mollis, or ſoft portion. See the article NERVE.

The portio mollis enters the foramen of the os petroſum, and thence through various little apertures, gets into the labyrinth of the ear, where it expands over all its parts, and conſtitutes the primary organ of hearing.

The portio dura, paſſing the aquæduct of Fallopius, turns back one or more branches from the anterior ſurface of the proceſs of the petroſum, into the cavity of the cranium. It ſends off alſo another branch internally, which with the branch from the fifth pair, ſerves for the conſtruction of the chorda tympani. It alſo ſends off a number of other ſmall ramifications, which run to the muſcles and other parts of the tympanum.

AVE-MARIA, the angel Gabriel's ſalutation of the Virgin Mary, when he brought her the tidings of the incarnation.

It is become a prayer, or form of devotion, in the Romiſh church. Their chaplets and roſaries are divided into ſo many ave-maries, and ſo many pater-noſters, to which the papiſts aſcribe a wonderful efficacy.

Dr. Bingham obſerves, that among all the ſhort prayers uſed by the primitive Chriſtians before their ſermons, there is not the leaſt mention of an ave-maria.

AVENA, the OAT, in botany; ſee the article OAT.

AVENOR, an officer belonging to the king's ſtables, who provides oats for the horſes. He acts by warrant from the maſter of the horſe. See the article MASTER *of the Horſe*.

AVENUE, in gardening, a walk planted on each ſide with trees, leading to an houſe or wood, &c.

The Engliſh elm will do in all grounds, except ſuch as are very wet and ſhallow; and this is preferred to all other trees, becauſe it will bear cutting, heading or lopping in any manner, better than moſt others. The rough or ſmooth Dutch elm is approved by ſome, becauſe of its quick growth: this is a tree that will bear removing very well; it is alſo green almoſt as ſoon as any plant whatever in ſpring, and continues ſo as long as any; and it makes an incomparable hedge, and is preferable to all other trees for lofty eſpaliers. The lime is valuable for its regular growth, and fine ſhade. The horſe cheſnut is proper for all places that are not much expoſed to rough winds. The common cheſnut will do very well in a good ſoil, and riſes to a conſiderable height, when planted ſomewhat cloſe, though, when it ſtands ſingle, it is rather inclined to ſpread than grow tall. The beech is a beautiful tree, and naturally grows well with us in its wild ſtate; but it is leſs to be choſen for avenues than the beforementioned, becauſe it does not bear tranſplanting well, but is very ſubject to miſcarry. Laſtly, the abele is fit for any ſoil, and is the quickeſt grower of any foreſt-tree. It ſeldom fails in tranſplanting, and ſucceeds very well in wet ſoils, in which the others are apt to fail. The oak is but little uſed for avenues, becauſe of its ſlow growth.

The old method of planting avenues was with regular rows of trees, and this has been always kept ſo till of late; but we have now a much more magnificent way of planting avenues: this is by ſetting the trees in clumps or platoons, making the opening much wider than before, and placing the clumps of trees at about 300 feet diſtant from one another. In each of theſe clumps there ſhould be planted either ſeven or nine trees; but it is to be obſerved, that this is only to be practiſed where the avenue is to be of ſome conſiderable length; for, in ſhort walks this will not appear ſo ſightly as ſingle rows of trees. The avenues made by clumps are fitteſt of all for parks. The trees in each clump ſhould be planted 30 feet aſunder, and a trench ſhould be thrown up round the whole clump, to prevent the deer from coming to the trees to bark them. *Miller's Dict.*

AVENUE, in fortification, an opening or inlet into a fort, baſtion, or the like. See the article BASTION.

AVERAGE, in law, an ancient ſervice which the tenant owed to his lord, by horſe or carriage.

AVERAGE, in commerce, ſignifies the accidents and misfortunes which happen to ſhips and their cargoes, from the time of their loading and ſailing, to their return and unloading; and it is divided into three kinds. 1. The ſimple or particular average, which conſiſts in the extraordinary expences incurred for the ſhip alone, or for the merchandizes alone. Such is the loſs of anchors, maſts, and rigging, occaſioned by the common accidents at ſea; the damages which happen to merchandize by ſtorm, prize, ſhipwreck, wet or rotting; all which muſt be borne and paid by the thing which ſuffered the damage. 2. The large and common average, being thoſe expences incurred, and damages ſuſtained for the common good and ſecurity both of the merchandizes and veſſels, conſequently to be borne by the ſhip and cargo, and to be regulated upon the whole. Of this number are the goods or money given for the ranſom of the ſhip and cargo, things thrown over-board for the ſafety of the ſhip, the expences of unlading for entering into a river or harbour, and the proviſions and hire of the ſailors, when the ſhip is put under an embargo. 3. The ſmall averages, which are the expences for towing and piloting the ſhip out, or into harbours, creeks, or rivers, one third of which muſt be charged to the ſhip, and two thirds to the cargo.

Average is more particularly uſed for a certain contribution, that merchants make proportionably towards their loſſes. It alſo ſignifies a ſmall duty which thoſe merchants, who ſend goods in another man's ſhip, pay to the maſter for his care of them over and above the freight. Hence it is expreſſed in the bills of lading, paying ſo much freight for the ſaid Goods, with primage and average, accuſtomed.

AVERAGE, in agriculture, a term uſed by the farmers in many parts of England, for the breaking of corn-fields, eddiſh, or roughings.

The word in the firſt or law ſenſe is derived from *averium*, a labouring beaſt: in the ſecond, or mercantile ſenſe, from *averia*, goods, or chattels; from the French *avoir*, to have or poſſeſs. In the laſt, or the farmer's ſenſe, it may be derived from *haver*, an Engliſh name for oats.

AVER-CORN, that conveyed to the lord's granaries by his tenants.

AVERDUPOIS, or AVERDUPOISE *Weight*, a weight much uſed in England, and whoſe pound conſiſts of ſixteen ounces. See the article WEIGHT.

AVERIA, a general name for cattle of any kind; but, in law, is confined to oxen and horſes of the plough.

AVER-LAND, that plowed by the tenants for the uſe of their lord.

AVERMENT, an offer of the defendant to make good an exemption pleaded in abatement, or bar of the plaintiff's action.

General AVERMENT is the concluſion of every plea to the writ, or in bar of replications, or other pleadings, containing affirmative matter.

Particular AVERMENT is when the life of a tenant for life, or a tenant in tail, is averted.

AVERNI, among the ancient naturaliſts, implied certain lakes, grottoes, and other places, which infect with poiſonous ſteams or vapours.

AVER-PENNY, money paid inſtead of average.

AVERRHOA, in botany, a genus of plants, whoſe flower conſiſts of five lanceolated petals; the fruit is an apple of a turbinated and obtuſe pentagonal figure, containing five cells, in which are diſpoſed angular ſeeds, ſeparated by membranes.

AVERRHOISTS, a ſect of Peripatetic philoſophers, who appeared in Italy ſome time before the reſtoration of learning, and attacked the immortality of the ſoul.

They took their denomination from Averrhoes, a celebrated interpreter of Ariſtotle, born at Cordova in Spain, in the 12th century, from whom they borrowed their diſtinguiſhing doctrine. The founder of this ſect, Averrhoes, is ſometimes called the Commentator, by way of eminence, as being ſuppoſed to have entered beſt of all the commentators into the ſentiments of the philoſopher; inſomuch that ſome have pretended the ſoul of Ariſtotle had migrated into the body of Averrhoes.

The Averrhoiſts, who held the ſoul was mortal, according to reaſon or philoſophy, yet pretended to ſubmit to the Chriſtian theology, which declares it immortal. But the diſtinction was held ſuſpicious; and this divorce of faith from reaſon was rejected by the doctors of that time, and condemned by the laſt council of the Lateran, under Leo X. yet it was ſtill ſecretly maintained. Pomponatius, Cæſalpinus, and others, were ſuſpected of favouring this opinion; but the corpuſcular philoſophy, now introduced into Italy, ſeems almoſt to have extinguiſhed Averrhoiſm.

AVERRUNCATION, in the ancient agriculture, ſignified the ſame with pruning. See the article PRUNING.

AVERRUNCI, in the ancient mythology, an order of deities, whoſe peculiar office it was to avert misfortunes. Apollo and Hercules were of this order among the Greeks, and Caſtor and Pollux among the Latins.

The word is Latin, and compounded of *a*, from, or away, and the obſolete verb *verrunco*, to turn.

AVERTI, in the manege, implies ſuch a pace in a horſe as is regulated and required in the leſſons.

AUGES, in aſtronomy, the ſame with apſides. See APSIS.

AUGMENT, *Augmentum*, in grammar, an accident of certain tenſes of Greek verbs, being either the prefixing a ſyllable, or the encreaſe of the quantity of the initial vowels.

There are two ſpecies of augments, diſtinguiſhed by the epithets *temporale* and *ſyllabicum*. The *augmentum temporale* is when a ſhort vowel is changed into a long one, or a diphthong into another of greater length: an *augmentum ſyllabicum*, is when a ſyllable is added at the beginning of a word.

AUGMENTS, in mathematics, the ſame with increments. See FLUXIONS and INCREMENTS.

AUGMENTATION, in a general ſenſe, implies the act of adding or joining ſomething to another, in order to increaſe its magnitude, or render it more conſiderable.

The word is Latin, *augmentatio*, and derived from *augeo*, to increaſe.

Court of AUGMENTATION, a court erected in the 27th year of Henry VIII. to take care that the revenues of the crown were properly augmented by the eſtates ariſing from the ſuppreſſion of religious houſes. This court was diſſolved in the firſt year of the reign of queen Mary; but the office in which are many valuable records, ſtill remains.

AUGMENTATION, in heraldry, are additional charges to a coat armour, frequently given as particular marks of honour, and generally borne either on the eſcutcheon or a canton. Thus all the baronets of England bear the arms of Ulſter in Ireland.

AUGRE, or AWGRE, an inſtrument uſed by carpenters, millwrights, &c. for boring large round holes. It conſiſts of a wooden handle and an iron blade, terminated with a ſteel bit.

AUGURS, among the old Greeks and Romans, were officers appointed to foretel future events by the chattering and feeding of birds, &c. There was a college, or community, of them, conſiſting originally of three members, with reſpect to the three tribes, the Luceres, Rhamnenſes, and Tatienſes: afterwards the number was increaſed to nine, four of them patricians, and five plebeians: this was in the conſulſhip of M. Valerius, and Q. Apuleius. They bore an augural ſtaff, or wand, as the enſign of their authority. Cicero was of the college of Augurs.

AUGURY, in its firſt and proper ſenſe, the art of foretelling future events by the chattering, ſinging, and feeding of birds; but in its more general ſignification, compriſing all the different kinds of divination; which Varro diſtinguiſhes into four ſorts, according to the four elements; viz. Pyromancy, or augury by fire; Aeromancy, or augury by air; Hydromancy, or augury by water; and Geomancy, or augury by the earth. It was a very ancient ſuperſtition; for we find it forbidden by Moſes. It was in great eſteem among the Chaldæans, from whom the Greeks learned it; and from them the Tuſcans had ſo high a value for this art, that, by a decree of the ſenate, it was ordered, that the advice of the augurs ſhould be held ſacred, and never deviated from. But what opinion the wiſer Romans had of the art, appears from the ſaying of Cato, recorded by Cicero, that he wondered how two augurs could meet, without laughing in each other's face.

The place from whence auguries were taken, was a riſing-ground; and Servius, on Virgil, obſerves, that there was a field ſet apart for it, at a little diſtance from Rome. When all things were diſpoſed for taking an augury, the augur entered into his tent or pavillion, habited in his robe, and holding his augural ſtaff in his hand; with which he divided the heavens into four parts, drawing a line from eaſt to weſt, and another croſs it from north to ſouth: then he ſacrificed to the gods, and offered up a prayer, after which he returned to his ſeat, and obſerved with great attention from what part, and in what manner, the ſign from heaven appeared. If, for inſtance, there happened lightning, or a clap of thunder, from the left, it was taken for a favourable preſage.

But the principal kind of augury, and from which it has its name, was the obſervation of birds; to which the ancients were ſo ſuperſtitiouſly addicted, that they never would undertake any thing of the leaſt importance, without conſulting theſe feathered oracles. The invention of this art is by ſome aſcribed to Prometheus; by others to Orpheus.

The Romans, whenever they went to war, not only conſulted the chattering and flight of birds, but their manner of feeding likewiſe; for which purpoſe they kept poultry, which they commonly fetched from the iſland of Eubœa. When they would take a preſage from thence, they flung corn before them: if the ſacred chickens crowed about it, and ate it greedily, it was looked upon as a favourable omen; but if they refuſed to eat or drink, it was an unlucky ſign.

AUGUST, in chronology, the eighth month of the year, according to our method of computing, beginning with January: but it was the ſixth with the Romans, who, for that reaſon called it Sextilis; which name was changed to Auguſt, from Auguſtus Cæſar, becauſe this emperor, being returned from the Gauls in the 746th year of Rome, endeavoured to reform the calendar; and in honour of him, Sextilis was changed to Auguſt. Others alledge, the reaſon was becauſe he was firſt made conſul in this month, and becauſe he gained great victories in it. The Turks have alſo taken this name from the Greek or Roman calendars, ſince they call it Agoſtos.

AUGUSTALES, in Roman antiquity, an epithet given to the flamens or prieſts appointed to ſacrifice to Auguſtus, after his deification, and alſo to the ludi or games celebrated in honour of the ſame prince, on the fourth of the ides of October.

AUGUSTALIA, a feſtival inſtituted by the Romans, in honour of Auguſtus Cæſar, on his return to Rome, after having ſettled peace in Sicily, Greece, Syria, Aſia, and Parthia; on which occaſion they likewiſe built an altar to him, inſcribed *Fortunæ reduci.*

AUGUSTALIS PRÆFECTUS, a title peculiar to a Roman magiſtrate who governed Egypt, with a power much like that of a pro-conſul in other provinces.

AUGUSTAN, in a general ſenſe, denotes ſomething relating to the emperor Auguſtus. Thus, we ſay, Auguſtan age, Auguſtan æra, &c.

AUGUSTINE MONKS, a religious order in the church of Rome, who followed the pretended rule of St. Auguſtin, preſcribed them by pope Alexander IV. in the year 1256. There had ariſen ſeveral religious orders in the thirteenth century, as the preaching brothers, founded by Dominic Guzman; the minims, by St. Francis Aſſiſſius; and others. Innocent IV. formed a deſign of uniting ſeveral of theſe orders into one; which deſign was executed by his ſucceſſor Alexander IV. who made one congregation of them, under the name of Auguſtin hermits.

At preſent the order is divided into ſeveral branches; as the hermits of St. Paul; the Ieronymitans; the monks of St. Bridget; and the bare-footed Auguſtins, inſtituted by a Portugueſe, in 1574, and confirmed by pope Clement VIII. in 1600. As to the rule of St. Auguſtin, which they pretend to follow, it is briefly this: The monks are to have all things in common: the rich, who enter into the order, are to ſell their poſſeſſions, and give them to the poor: nothing is to be received, without leave of the ſuperior; if it happens that the monks are obliged, through perſecution to retire, they are to betake themſelves immediately to the place whither their ſuperior is withdrawn: they are to employ the firſt part of the morning in labouring with their hands, and the reſt in reading: they have Saturday allowed them to provide themſelves with neceſſaries, and are permitted to drink wine on Sundays. When they go abroad, they muſt always go two in a company: they are never to eat but in their monaſtery: they are forbidden to harbour the leaſt thought of women: they are to receive no letters or preſents in ſecret. Theſe, with ſeveral other precepts relating to charity, modeſty, chaſtity, and other Chriſtian virtues, conſtitute what they call the rule of St. Auguſtin, which is read in the preſence of the monks once every week. The Auguſtins are cloathed in black. At Paris, they are known under the name of the religious of St. Genevieve, that abbey being the chief of the order. There are nuns likewiſe of this order.

AUGUSTINUS, the name of Janſenius's treatiſe, from which are collected the five famous propoſitions enumerated under the article Janſeniſm. See JANSENISM.

AVIARY, a place ſet apart for feeding and propagating birds. It ſhould be ſo large, as to give the birds ſome freedom of flight; and turfed, to avoid the appearance of foulneſs on the floor.

AVIS, the name of an order of knighthood in Portugal, inſtituted by Sancho the firſt king, in imitation of the order of Alcantara, whoſe green croſs they wear.

AULA is uſed for a court baron, by Spelman; by ſome old eccleſiaſtical writers, for the nave of a church, and ſometimes for a court-yard.

AULIC, an epithet given to certain officers of the empire, who compoſe a court, which decides, without appeal, in all proceſſes entered in it. Thus we ſay, aulic council, aulic chamber, aulic counſellor.

The aulic council is compoſed of a preſident, who is a catholic; of a vice-chancellor, preſented by the archbiſhop of Mentz; and of eighteen counſellors, nine of whom are proteſtants, and nine catholics. They are divided into a bench of lawyers, and always follow the emperor's court, for which reaſon they are called *juſtitium imperatoris*, the emperor's juſtice, and aulic council. The aulic court ceaſes at the death of the emperor; whereas the imperial chamber of Spire is perpetual, repreſenting not only the deceaſed emperor, but the whole Germanic body, which is reputed never to die.

AULIC in the Sorbonne and foreign univerſities, is an act which a young divine maintains upon being admitted a doctor in divinity.

It begins by an harangue of the chancellor, addreſſed to the young doctor, after which he receives the cap, and preſides at the aulic, or diſputation.

AULNEGER, or ALNAGER. See the article ALNAGER.

AULOS, αυλος, a Grecian long-meaſure; the ſame with ſtadium. See STADIUM.

AUMBRY, a country word denoting a cupboard. See CUPBOARD.

AUME, a Dutch meaſure for Rheniſh wine, containing forty Engliſh gallons.

AUNCEL-WEIGHT, an ancient kind of ballance, now out of uſe, being prohibited by ſeveral ſtatutes, on account of the many deceits practiſed by it. It conſiſted of ſcales hanging on hooks, faſtened at each end of a beam, which a man lifted up on his hand. In many parts of England, auncel-weight ſignifies meat ſold by the hand, without ſcales.

AUNE, a long-meaſure uſed in France to meaſure cloth, ſtuffs, ribbons, &c.

At Rouen it is equal to one Engliſh ell, at Calais to 1.52, at Lyons to 1.016, and at Paris to 0.95.

AVOCATORIA, a mandate of the emperor of Germany, addreſſed to ſome prince, in order to ſtop his unlawful proceedings in any cauſe appealed to him.

AVOIDANCE, in the canon law, is when a benefice becomes void of an incumbent, which happens either in

faſt,

fact, as by the death of the parſon, or in law, as by ceſſion, deprivation, reſignation, &c. In the firſt of theſe caſes, the patron muſt take notice of the avoidance, at his peril; but in avoidance by law, the ordinary is obliged to give notice to the patron, in order to prevent a lapſe.

AVOWEE, one who has a right to preſent to a benefice. See ADVOWSON.

He is thus called in contradiſtinction to thoſe who only have the lands to which the advowſon belongs for a term of years, or by virtue of intruſion or diſſeiſin. See the article INTRUSION, &c.

AVOWRY, in law, is when a perſon diſtrained ſues out a replevin; for then the diſtrainer muſt avow, and juſtify his plea, which is called his avowry. See the article REPLEVIN.

The avowry muſt contain ſufficient matter for judgment to have return, but ſo much certainty is not required therein, as in a declaration; and if made for rent, though it appears that part of that rent is not due, yet the avowry is good for the reſt.

AURA, in chemiſtry, a certain fine and pure ſpirit, found in every animal or vegetable body; but ſo ſubtile, as only to be ſuſceptible by its ſmell and taſte, or other effects, not found in any other but that body. This aura exhibits the proper characters of the body, by which it is accurately diſtinguiſhed from all others; but is itſelf too fine and thin to be ſeen by the eyes, though armed with a microſcope; or felt by the hands; and withal, is extremely volatile; ſo that, when pure and ſingle, it flies off by its great mobility, mixes with the air, and is received into the great chaos of all volatiles; and there, ſtill retaining its ſame nature, it floats till it falls down in ſnow, hail, rain, or dew, when it again enters the boſom of the earth, impregnates it with its prolific virtue, and is at length received by other juices of the earth, and conveyed into the bodies of animals and vegetables; and, by this revolution, paſſes into new bodies, whoſe maſs it animates and directs. The ſubtle fluid is lodged in the oil of the body, to prevent its being diſſipated and thrown off; and hence it is, that all the ancient alchymiſts ſay, ſpirit reſides in ſulphur. *Boerh. Chem.*

AURANTIUM, in botany, the orange. See the article ORANGE.

AURELIA, in natural hiſtory, the ſame with what is more uſually called chryſalis, and ſometimes nymph. See the articles CHRYSALIS and NYMPH.

AUREOLA, in its original ſignification, ſignifies a jewel which is propoſed as a reward of victory in ſome public diſpute. Hence the Roman ſchoolmen applied it to denote the reward beſtowed on martyrs, virgins, and doctors, on account of their works of ſupererogation: and painters uſe it to ſignify the crown of glory, with which they adorn the heads of ſaints, confeſſors, &c.

AUREUS, a Roman gold coin, equal in value to twenty-five denarii.

According to Ainſworth, the aureus of the higher empire weighed near five penny-weight; and in the lower empire, little more than half that weight. We learn from Suetonius, that it was cuſtomary to give aurei to the victors in the chariot-races.

AURICLE, in anatomy, that part of the ear, which is prominent from the head, called by many authors auris externa. See the article EAR.

AURICLES *of the Heart.* Theſe are a kind of appendages of the heart at its baſe, and are diſtinguiſhed by the names of the right and left. The right auricle is much larger than the left, and this is placed in the hinder, that in the anterior part. They are intended as diverticula for the blood, during the ſyſtole. Their ſubſtance is muſcular, being compoſed of ſtrong fibres, and their motion is not ſynchronous, but achronous with that of the heart. See the article HEART.

AURICULAR, whatever belongs or relates to the ear. Thus we ſay, auricular witneſs, auricular confeſſion, &c. as being done ſecretly, and as it were in the ear.

AURICULAR *Medicines*, ſuch as are uſed in the cure of diſtempers in the ear. See the article EAR.

AURICULARIS *Digitus*, the little finger, ſo called, becauſe it is commonly uſed to pick the ear.

AURIGA, the WAGGONER, in aſtronomy, a conſtellation of the northern hemiſphere, conſiſting of twenty-three ſtars, according to Tycho; forty according to Hevelius; and ſixty-eight in the Britannic catalogue.

AURIPIGMENTUM, ORPIMENT, in natural hiſtory. See ORPIMENT.

AURIS, the ear, in anatomy. See EAR.

AURISCALPIUM, an inſtrument to clean the ears, and ſerving alſo for any other operation in diſorders of that part.

AURORA, the morning twilight, or that faint light which appears in the morning, when the ſun is within eighteen degrees of the horizon.

AURORA, the goddeſs of the morning, according to the pagan mythology. She was the daughter of Hyperion and Theia, according to Heſiod; but of Titan and Terra, according to others. It was under this name that the ancients deified the light, which foreruns the riſing of the ſun above our hemiſphere. The poets repreſent her as riſing out of the ocean, in a chariot, with roſy fingers dropping gentle dew. Virgil deſcribes her aſcending in a flame-coloured chariot with four horſes.

AURORA *Borealis*, the northern dawn or light; a remarkable meteor of a luminous appearance, often viſible during the night in the northern parts of the heavens.

This meteor exhibits a great variety of phænomena, of which the following are the principal.

1. In the northern part of the horizon there is commonly the appearance of a very black cloud; we ſay appearance, becauſe it is evidently no real cloud, the ſmalleſt ſtars being viſible through it. This apparent cloud is extended ſometimes farther towards the weſt than towards the eaſt; ſometimes farther towards the eaſt than towards the weſt; and generally takes up about a quarter of the horizon.

2. The upper edge of this cloud is generally terminated by a very lucid arch, from one to four or five degrees broad, whoſe center is below the horizon. Sometimes there are two or more of theſe arches, one above another. In ſome the cloud is not terminated by an arch, but by a long ſtreak of light lying parallel to the horizon. The limb of this luminous arch, or parallel ſtreak, is not always even and regular, but ſinks lower in ſome parts than in others.

3. Out of this arch proceed ſtreams of light, generally perpendicular to the horizon, but ſometimes a little inclined to it. Moſt of them ſeem to end in a point, like pyramids or cones, and often very much reſemble the tails of comets. Sometimes there is no luminous arch, nor ſtreak of light; and then the ſtreams ſeem to iſſue out from behind the dark cloud, being diſtinct from each other at their baſes.

4. The upper ends of the ſtreams inceſſantly appear and vaniſh again, as quick as if a curtain were drawn backwards and forwards before them; which ſometimes cauſes ſuch a ſeeming trembling in the air, that the upper part of the heavens were, if we may be allowed the expreſſion, in convulſions.

5. They ſometimes ſeem to meet in the zenith, or more commonly about ten degrees to the ſouthward of it, and there curling round, they, in ſome meaſure, imitate a flame confined under an arch; and being frequently tinged with various colours, exhibit a moſt beautiful appearance, reſembling a canopy finely painted, of about ten or twenty degrees in breadth.

In many auroras there are ſtreams aſcending from theſe parts of the heavens, which lie ſeveral degrees to the ſouthward of the canopy; and in ſome they appear to ariſe, though very rarely, almoſt as large and numerous from the ſouthern as from the northern parts of the horizon.

6. The height of the aurora borealis is very great; for that on the 6th of March 1715, was viſible from the weſt ſide of Ireland, to the confines of Ruſſia and Poland to the eaſt; and perhaps much further; extending at leaſt over thirty degrees of longitude, and in latitude from about the fiftieth degree over almoſt all the north of Europe, and exhibiting, nearly at the ſame time, the ſame appearances at all places.

7. Theſe phænomena have always been very frequent in countries near the frigid zone, but very rare in our latitude,

latitude. They are now however become very frequent with us, but always ſeem to proceed from the north; and are as yet unknown to the inhabitants of the more ſouthern parts of our hemiſphere. Whether they are known to thoſe who inhabit the ſouthern frigid zone, is yet undetermined.

8. In ſome there are trains of light running horizontally, ſometimes from the middle of the extremes, and ſometimes with one extreme to another: and from theſe trains ſtreams perpendicular to the horizon often ariſe, and accompany them as they paſs along.

9. When all the ſtreaming is over, the aurora borealis commonly degenerates into a bright twilight in the north, and there gradually dies away.

10. It is probable theſe phænomena often happen in cloudy nights, though we are not ſenſible of them; for it is obſervable that in ſuch nights there is frequently more light than what uſually proceeds from the ſtars alone.

The moſt obvious ſolution of the aurora borealis, or at leaſt what would appear ſo to thoſe who have only attended to the circumſtances of ſome particular meteors of this kind, is, that it is a thin nitro-ſulphureous vapour, raiſed in our atmoſphere, conſiderably higher than the clouds; that this vapour, by fermentation, takes fire, and the exploſions of one portion of it kindling the next, the flaſhes ſucceed one another till the whole quantity of vapour within their reach is ſet on fire.

Some have thought that vapours rarefied exceedingly by ſubterraneous fire, and tinged with ſulphureous ſteams, might thence be diſpoſed to ſhine in the night, and riſing up to the top of the atmoſphere, or even beyond its limits, might produce thoſe undulations in the air, which conſtitute this phænomenon. But theſe hypotheſes have been rejected, as inſufficient; it having been thought impoſſible to account for all the circumſtances from them.

Dr. Halley therefore thought proper to have recourſe to the magnetic effluvia of the earth, which he ſuppoſes to perform the ſame kind of circulation with regard to it, as the effluvia of any particular terrella do with reſpect to that, viz. that they enter the earth near the ſouth pole, and, pervading its pores, paſs out again at the ſame diſtance from the northern: and thinks, they may ſometimes, by the concourſe of ſeveral cauſes, very rarely coincident, and to us as yet unknown, be capable of producing a ſmall degree of light, either from the greater denſity of the matter, or perhaps from the greater velocity of its motion; after the ſame manner as we ſee electrical bodies emit light in the dark.

M. de Mairan has given us a phyſical and hiſtorical treatiſe on the aurora borealis, and endeavours to prove, that it is owing to the zodiacal light, or the atmoſphere of the ſun, ſpread on each ſide of it along the zodiac, in the form of a pyramid. This he ſays is ſometimes extended to ſuch a length as to reach beyond the orbit of our earth, and then by mixing itſelf with our atmoſphere, and being of a heterogeneous nature, produces the ſeveral appearances obſervable in the aurora borealis.

We thought proper to mention theſe ſolutions, becauſe they come from two very ingenious philoſophers, though they are certainly too fine-ſpun to hold, and ſeem no other than the ingenious reveries of perſons determined to frame an hypotheſis at any rate. We may certainly find materials for the aurora borealis, without having recourſe either to the magnetical effluvia of the earth, or the zodiacal light, the nature of both which we are wholly unacquainted with. The effluvia continually exhaled from the ſurface of the earth, if rightly conſidered, will afford a very eaſy and natural ſolution, as we ſhall now endeavour to ſhew.

First, We know from experiment, that there are ſome ſteams; as inflammable ſulphureous ones, which are capable of ſo great a degree of expanſion, that they will render themſelves lighter than the air they float in, even when that fluid is as rare as it can be rendered by art; for they will riſe to the top of an exhauſted receiver: ſuch ſteams, or exhalations, therefore, iſſuing from mines, volcanos, &c. in the bowels of the earth, muſt neceſſarily aſcend towards the top of the atmoſphere, at leaſt till they come to a region where the air is as rare and as much expanded as it can be made by the air-pump here below. This height, according to Dr. Halley's computation, founded on the refraction of a ray of light, is forty-four miles and a half (ſee Atmosphere): but may probably be much greater; for the air is higher than any vapours capable of refracting a ray of light can aſcend.

Secondly, Theſe effluvia being raiſed to the top of the atmoſphere, or near it, and floating there, will neceſſarily be carried towards the polar regions, for the following reaſons. 1. Becauſe the ſuperior current of the air, at a great diſtance from the equator, tends that way. 2. We know from experiment that whatever ſwims upon a fluid, which revolves about an axis, is by that very motion carried towards the extremities of that axis. This is exactly the caſe of theſe effluvia; for they float near the top of the atmoſphere, which continually revolves about the axis of the earth; and muſt therefore be neceſſarily carried towards the polar regions. 3. Theſe effluvia being collected together, at or near the poles, and of an inflammable nature, may eaſily be ſuppoſed to ferment, when they meet with other heterogeneous particles proper for producing ſuch an effect, and emit fiery ſtreams, which will naturally riſe into ſuch parts of the atmoſphere as are ſtill lighter than that in which theſe corpuſcles naturally floated; that is, directly upwards from the center of the earth: but, according to the rules of perſpective, theſe ſtreams, though they really diverge as radii from a center, will appear to a ſpectator on the ſurface of the earth to converge towards a point; which point will ſeem to be directly over his head, if the ſtreams aſcend in right lines from the center of the earth; but if they deviate all one way from that direction, the point will be on that ſide the zenith towards which they incline. To illuſtrate this, let us ſuppoſe ſeveral ſtrings to hang down from the ceiling of a room, and a candle to be placed on a table below them: ſhadows of theſe threads will all converge towards the point on the ceiling immediately over the candle: and if they are made to incline from a perpendicular direction, ſuppoſe all one way, the point of convergency will remove from the ſpot immediately over the candle, towards that ſide of the room to which the upper ends of the ſtrings incline. Now, if a perſon had viewed them from the place where the candle was ſet, and referred their places to the ceiling, they would have appeared to have converged towards the ſame point to which their ſhadows were directed by the candle.

And if the ſtreams ſpread themſelves as they riſe, but not too much, they will ſtill appear tapering towards their upper-ends like cones or pyramids; juſt as the ſides of a long walk ſeem to a perſon viewing it from one end, to approach each other at the fartheſt extremity.

Hence every phænomenon of the aurora borealis may be eaſily accounted for; and its height may be calculated in the following manner.

Let the ſine of the elevation of the pole be $= q$, the ſine of the greateſt altitude of the lucid arch $= m$, the ſine of half the diſtance of the legs of the arch from each other, at the horizon $= g$, the ſemi-diameter of the earth $= a$, and the ſine of the angle, which is equal to the greateſt altitude of the arch, and the altitude of the equator taken together, be $= b$; thus the diſtance of the matter in the vertex of the arch, from an obſerver, will be expreſſed by $\frac{2amq^2g^2}{r^2b^2-rg^2q^2}$.

AURUM, Gold, in natural hiſtory; ſee the article Gold.

The Latin term, *aurum*, is chiefly uſed to denote certain chemical preparations, whereof gold is the principal ingredient.

Aurum *Fulminans*, a chemical compoſition prepared by diſſolving gold in aqua regia, and precipitating the metal from the menſtruum, by adding a volatile alkali: after which the precipitated powder is edulcorated by frequent effuſions of warm water, and then dried in the ſhade.

The aurum fulminans, prepared in this manner, weighs about one fourth part more than the gold employed, three parts of gold yielding four of the fulminating powder;

according to Lemery, Kunckel, and other practical writers. Part of the increaſe proceeds from the volatile alkali; for, on adding to the aurum fulminans a little vitriolic acid, the volatile ſalt riſes in ſublimation, ſatiated with the acid: the remaining powder is found to be diveſted of its fulminating power. From the coalition of the volatile alkali with the nitrous acid in the menſtruum reſults an ammoniacal nitre, a ſalt which of itſelf detonates on being heated; but by what power or mechaniſm its detonating quality is ſo remarkably increaſed in the aurum fulminans, is unknown.

The exploſion of aurum fulminans is more vehement than of any other known kind of matter: it goes off in a leſs degree of heat than any of the other exploſive compoſitions; and even grinding it ſomewhat ſmartly in a mortar, is ſufficient for making it explode. Some inſtances are mentioned in the Breſlau collections, and the Ephemerides Naturæ Curioſorum, of a very ſmall quantity burſting in pieces the marble mortar in which it was rubbed; and an accident of the ſame kind happened ſome years ago to a ſkilful chemiſt here. The operator cannot therefore be too much on his guard in the management of ſo dangerous a preparation.

It has been reckoned, that a few grains of aurum fulminans act with as much force as ſeveral ounces of gun-powder: but the actions of the two are of ſo different kinds, that it is difficult to determine in what manner their ſtrength can be compared. The report of aurum fulminans is of extreme acuteneſs, offending the ear far more than that of a much larger quantity of gun-powder; but does not extend to ſo great a diſtance, ſeeming to differ from it as the ſound of a ſhort or tenſe muſical ſtring, from that of a long one, or of one which is leſs ſtretched. In ſome experiments made before the Royal Society, and mentioned in the firſt volume of Dr. Birch's hiſtory, aurum fulminans cloſed up in a ſtrong hollow iron ball, and heated in the fire, did not appear to explode at all; while gun-powder, treated in the ſame manner, burſt the ball. On the other hand, a little aurum fulminans, exploded on a metalline plate in the open air, makes an impreſſion or perforation in the plate; an effect which gun-powder could ſcarcely produce in any quantity.

This remarkable effect of aurum fulminans on the body which ſerves for its ſupport, has induced ſome to believe that its action is exerted chiefly or ſolely downwards. It appears, however, to act in all directions: for a weight laid upon it, either receives a like impreſſion, or is thrown off: and, in the collection above mentioned, an account is given of a large quantity (ſome ounces) which exploding from too great heat uſed in the drying of it, broke open the doors, and ſhattered the windows in pieces. Mr. Hellot found, that when a few grains of the powder were placed between two leaves of paper, and cemented to one of them by gum water, only the leaf which touched the powder was torn by the exploſion, and the other ſwelled out; and that when both were brought into cloſe contact with it, by preſſing them together, it tore them both; from whence he concludes, that the action of the aurum is greateſt on the bodies which it immediately touches. Both this property, and the acuteneſs of the report, may poſſibly depend upon one cauſe, the celerity of the expanſion: experiments have ſhewn, that the reſiſtance of the air, to bodies in motion, increaſes with the velocity of the body in a very high ratio; and perhaps the velocity with which aurum fulminans explodes, may be ſo great, that it is reſiſted by the air as by a ſolid maſs. *Lewis's Commercium Philoſophico-Technicum.*

Aurum *Muſivum*, or *Moſaicum*, a chemical preparation uſed by japanners in gilding their veſſels: it is made in the following manner.

Take of tin one pound, of flowers of ſulphur ſeven ounces, of ſal ammoniacum and purified quickſilver, each half a pound. Melt the tin, and add the quickſilver to it in that ſtate; and when the mixture is become cold, powder it, and grind it with the ſal ammoniacum and ſulphur, till the whole be thoroughly commixt. Calcine them in a mattraſs; and the other ingredients ſubliming, the tin will be converted into the aurum moſaicum; and will be found in the bottom of the glaſs like a maſs of bright fleaky gold powder: but if any black or diſcoloured parts appear in it, they muſt be carefully picked or cut out.

The ſal ammoniacum employed, ought to be perfectly white and clean; and care ſhould be taken, that the quickſilver be not ſuch as is unadulterate with lead, which may be known by putting a ſmall quantity in a crucible, into the fire, and obſerving when it is taken out, whether it be wholly ſublimed away, or have left any lead behind it. The calcination may be beſt performed in a coated glaſs body, hung in the naked fire; and the body ſhould be of a long figure, that the other ingredients may riſe ſo as to leave the coloured tin clear of them. The quickſilver, though it be formed into cinnabar along with the ſulphur, need not be waſted; but may be revived by diſtilling it with the addition of quick-lime.

Aurum *Potabile*, or tincture of gold, a medicine formerly of great requeſt, but at preſent rarely if ever uſed. It is prepared by mixing eſſential oil of roſemary with a ſolution of gold in aqua-regia; and, after ſhaking the veſſel, the gold will be retained in the oil, ſwimming on the top. This oil is ſeparated by inclination, and afterwards digeſted for a month in highly rectified ſpirit of wine.

But, after all, this is not a genuine tincture of gold, being only the gold divided into very ſmall parts by the ſpicula of the aqua-regia, ſwimming in the oil of roſemary; nor can there be any radical tincture of gold, which may not, by evaporating the oil, be reduced to a powder, and the powder by melting reduced into gold. The virtues of this tincture are entirely owing to the oil of roſemary.

AUSPICIUM. See Augury.

AUSTERE, rough, aſtringent. Thus an auſtere taſte is ſuch a one as conſtringes the mouth and tongue with ſome auſterity; as the taſte of unripe fruit.

Things of an auſtere taſte are ſuppoſed by ſome, from their glutinous quality, to generate the ſtone.

AUSTERITY, among moral writers, implies ſeverity and rigour. Thus we ſay, auſterity of manners.

Auſterity of bodies, according to the Carteſians, conſiſts in having obtuſe angular particles, like a blunt ſaw.

AUSTRAL, *Auſtralis*, ſomething relating to the ſouth: thus the ſix ſigns on the ſouth ſide of the equinoctial, are called auſtral ſigns.

AUSTRIA, a circle of Germany, comprehending the arch-dutchy of Auſtria, alſo Styria, Carinthia, Carniola, Tyrol, Trent, and Brixen.

It is bounded by Bohemia and Moravia on the north; by Hungary, Sclavonia, and Croatia on the eaſt; by the dominions of Venice on the ſouth; and by Bavaria on the weſt.

AUTER DROIT, in law, is when perſons ſue, or are ſued in another's right, as executors, guardians, &c.

AUTER FOIS ACQUIT, in law, a plea made by a criminal that he has been already acquitted of the ſame crime with which he is charged. There are likewiſe pleas of auter fois convict and attaint, that he has been before convicted of the ſame felony.

AUTHENTIC, ſomething of acknowledged and received authority. In law it ſignifies ſomething cloathed in all its formalities, and atteſted by perſons to whom credit has been regularly given. Thus, we ſay authentic papers, authentic inſtruments.

AUTHOR properly ſignifies one who created or produced any thing. Thus God, by way of eminence, is called the Author of nature, the Author of the univerſe.

The word author is ſometimes employed in the ſame ſenſe as inventor. As, Otho de Guerick is reported to be the author of the air-pump.

Author, in matters of literature, a perſon who has compoſed ſome book or writing.

Authors may be diſtinguiſhed into ſacred and profane, ancient and modern, known and anonymous, Greek, Latin, Engliſh, French, &c. and with regard to the ſubjects they treat, into divines, philoſophers, orators, hiſtorians, poets, grammarians, phyſiologiſts, &c. See the articles Sacred, Profane, &c.

An original author is he, who, in treating any ſubject, does not follow any other perſon, or imitate any model, either in the matter or method of his compoſition: for inſtance, M. de Fontenelle is an original author in his Plurality of Worlds, but not in his Dialogues of the Dead.

AUTHORITY, in a general ſenſe, ſignifies a right to command, and make one's ſelf obeyed. In which ſenſe, we ſay, the royal authority, the epiſcopal authority, the authority of a father, &c.

Authority denotes alſo the teſtimony of an author, ſome apophthegm, or ſentence of an eminent perſon, quoted in a diſcourſe by way of proof.

AUTHORITY, in law, ſignifies a power given by word, or writing, to a ſecond perſon to act ſomething, and may be by writ, warrant, commiſſion, letter of attorney, &c. and ſometimes by law. An authority given to another, to do what a perſon himſelf cannot do is void, and it muſt be for doing a thing that is lawful, otherwiſe it will be no good authority.

AUTHORITY is repreſented, in painting, like a grave matron ſitting in a chair of ſtate, richly clothed in a garment embroidered with gold, holding in her right hand a ſword, and in her left a ſceptre. By her ſide is a double trophy of books and arms.

AUTO DA FE, act of faith. The ceremony of putting in execution the ſeveral ſentences pronounced on criminals by the tribunal of the inquiſition. It is ſo called, becauſe it is conſidered, in thoſe countries where that tremendous court is ſettled, at the moſt illuſtrious and public proof that can be given of a zeal for religion and the Catholic faith. See INQUISITON.

AUTOCEPHALOUS, αυτοκεφαλοι, in church hiſtory, denotes archbiſhops who were independent of any patriarch.

AUTOGRAPH, αυτογραφον, denotes a perſon's handwriting, or the original manuſcript of any book, &c.

AUTOMATUM, or AUTOMATON, αυτοματον, an inſtrument, or rather machine; which, by means of ſprings, weights, &c. ſeems to move itſelf as a watch, clock, &c. Such alſo were Archytus's flying dove, Regiomontanus's wooden eagle, &c.

AUTUMN, the third ſeaſon of the year, when the harveſt and fruits are gathered in. Hence, in the language of the alchemiſts, it ſignifies the time when the philoſophers ſtone is brought to perfection.

AUTUMN is repreſented, in painting, by a man at perfect age, cloathed like the vernal, and likewiſe girded with a ſtarry girdle; holding in one hand a pair of ſcales equally poized, with a globe in each; in the other, a bunch of divers fruits and grapes. His age denotes the perfection of this ſeaſon, and the ballance, that ſign of the zodiac, which the ſun enters when our autumn begins.

AUTUMNAL, ſomething relating to autumn. Thus,

AUTUMNAL *Point* is that point of the equinox from which the ſun begins to deſcend towards the ſouth pole.

AUTUMNAL *Signs*, in aſtronomy, are the ſigns Libra, Scorpio, and Sagittarius, through which the ſun paſſes during the autumn. See ZODIAC, LIBRA, *&c.*

AUTUMNAL *Equinox*, the time when the ſun enters the autumnal point. See EQUINOX.

AUTUMNAL *Flowers*. See FLOWER.

AUX, in aſtronomy, the ſame with the apogeum of the ancients, or the aphelium of the moderns. See the articles APOGEUM and APHELIUM.

AUX alſo denoted the arch of the ecliptic, intercepted between the firſt degree of Aries and the apogeum.

AUXILIARY, *Auxiliaris*, whatever is aiding or helping to another.

AUXILIARY *Verbs*, in grammar, are ſuch as help to form or conjugate others; that is, are prefixed to them, to form or denote the moods or tenſes thereof. As *to have* and *to be*, in the Engliſh; *être & avoir*, in the French; *ho & ſono*, in the Italian, &c.

In the Engliſh language, the auxiliary verb *am*, ſupplies the want of paſſive verbs. See PASSIVE.

AUXILIUM, in law, the ſame with aid. See AID.

AUXILIUM *Curiæ*, in law, a precept or order of court, to cite or convene one party at the ſuit of another.

AUXILIUM *ad filium militem faciendum, vel filiam maritandum*, a precept, or writ directed to the ſheriff of every county where the king, or other lords, had any tenants, to levy of them reaſonable aid towards the knighting his eldeſt ſon, or the marriage of his eldeſt daughter. See the article AID.

AWARD, in law, the judgment of an abitrator, or of one who is not appointed by the law a judge, but choſen by the parties themſelves for terminating their difference. See ARBITRATOR.

A-WEIGH, in navigation, the anchor is called a-weigh, or a-trip, when the cable, being drawn perpendicular to it, and continued to be heaved into the ſhip, at length weighs or trips it out of the ground.

AWL, or AUL, among ſhoe-makers, an inſtrument wherewith holes are bored through the leather, to facilitate the ſtitching, or ſewing the ſame. The blade of the awl is uſually a little flat and bended, and the point ground to an acute angle.

AWME, or AUME, a Dutch liquid meaſure, containing eight ſteckans, or twenty verges or verteels, equal to the tierce in England, or to one ſixth of a ton of France.

AWN, ariſta, in botany. See ARISTA.

AWNING, among ſeamen, a canopy of canvas extended over the decks in hot weather, to protect them from being ſplit by the heat of the ſun; likewiſe for the convenience of the officers, &c. An awning is ſupported by a range of ſmall pillars, called ſtanchions, on each ſide of the deck, and ſuſpended in the middle by crowfeet. See the article CROWFOOT.

AX, among carpenters, an inſtrument wherewith to hew wood.

This implement differs from the joiners hatchet, as being deeper and heavier.

AXILLA, in anatomy, the arm-pit, or the cavity under the upper part of the arm.

AXILLA, in botany, the ſpace comprehended betwixt the ſtems of plants and their leaves.

AXILLARY, *Axillaris*, ſomething belonging to, or lying near the axilla. Thus,

AXILLARY *Artery* is that part of the ſubclavian branches of the aſcending trunk of the aorta, which paſſeth under the arm-pits. See ARTERY.

AXILLARY *Glands* are ſituated under the arm-pits, enveloped in fat, and lie cloſe by the axillary veſſels.

AXILLARY *Vein*, one of the ſubclavian veins which paſſes under the arm-pit, dividing itſelf into ſeveral branches, which are ſpread over the arm. See VEIN.

AXIOM, in philoſophy, is ſuch a plain, ſelf-evident, and received notion, that it cannot be made more plain and evident by demonſtration; becauſe it is itſelf better known than any thing that can be brought to prove it: as, that nothing can act where it is not; that a thing cannot be, and not be, at the ſame time; that the whole is greater than a part thereof; and that from nothing, nothing can ariſe.

By axioms, called alſo maxims, are underſtood all common notions of the mind, whoſe evidence is ſo clear and forcible, that a man cannot deny them, without renouncing common ſenſe and natural reaſon.

The rule whereby to know an axiom, is this: Whatever propoſition expreſſes the immediate clear compariſon of two ideas without the help of a third, is an axiom. But if the truth does not appear from the immediate compariſon of two ideas, it is no axiom.

Theſe ſort of propoſitions, under the name of axioms, have, on account of their being ſelf-evident, paſſed not only for principles of ſcience, but have been ſuppoſed innate, and thought to be the foundation of all our other knowledge; though, in truth, they are no more than identic propoſitions: for to ſay that all right angles are equal to each other, is no more than ſaying, that all right angles are right angles, ſuch equality being implied in the very definition. All conſideration of theſe maxims, therefore, can add nothing to the evidence or certainty of our knowledge of them; and how little they influence the reſt of our knowledge, how far they are from being the foundation of it, as well as of the truths firſt known to the mind, Mr. Locke, and ſome others, have undeniably proved.

According to Bacon, it is impoſſible that axioms, raiſed by augmentation, ſhould be uſeful in diſcovering new works; becauſe the ſubtilty of nature far exceeds the ſubtilty of arguments: but axioms, duly and methodically drawn from particulars, will again eaſily point out new particulars, and ſo render the ſciences active.

The axioms in uſe being derived from ſlender experience, and in a few obvious particulars, are generally applied in a correſponding manner. No wonder, therefore, they lead us to few particulars; and if any inſtance, unobſerved before, happen to turn up, the axiom is preſerved by ſome trifling diſtinction, where it ought rather to be corrected.

Axiom is alſo an eſtabliſhed principle in ſome art or ſcience.

Thus it is an eſtabliſhed axiom in phyſics, that nature does nothing in vain: ſo it is in geometry, that if to equal things you add equals, the ſums will be equal. It is an axiom in optics, that the angle of incidence is equal to the angle of reflection, &c. In which ſenſe too, the general laws of motion are called axioms: whence it may be obſerved, that theſe particular axioms are but deductions from certain hypotheſes.

AXIS properly ſignifies a line, or long piece of iron or wood, paſſing through the center of a ſphere, and about which the ſphere revolves.

Axis *of the World* is an imaginary right line conceived to paſs through the center of the earth, from one pole to another, about which the ſphere of the world, according to the Ptolemaic ſyſtem, revolves in its diurnal motion.

Axis, in geometry, is that ſtraight line in a plain figure at reſt, about which the figure revolves, in order to form or generate a ſolid.

Tranſverſe Axis *of an Ellipſis*, is the longeſt axis A B (plate XIX. *fig.* 3.) drawn through the center C of the ellipſis.

Conjugate Axis *of an Ellipſis*, is the ſhorteſt axis F E, drawn through the center C, and cutting the tranſverſe axis at right angles.

Axis *of a Cone* is the ſtraight line or ſide, about which the right angled triangle forming the cone, moves; and ſo only a right cone can properly have an axis, becauſe an oblique cone cannot be generated by the motion of a plain figure about a ſtraight line at reſt: but becauſe it is plain from the definition, that the axis of a right cone is a ſtraight line, drawn from the center of its baſe to the vertex; therefore, the writers of conic ſections call likewiſe that line drawn from the center of the baſe of an oblique cone to the vertex, the axis of the cone.

Axis *of a conic Section* is a ſtraight line divided into two equal parts, and cutting all the ordinates at right angles. Thus, if AMP (plate XIX. *fig.* 4.) be drawn ſo as to cut the ordinate MN at right angles, and divide the ſection into two equal parts, then is the line AMP the axis of the ſection.

Tranſverſe Axis *of an Hyperbola* is the axis A P (plate XIX. *fig.* 5.) cutting the curves in the points A and P.

Conjugate Axis *of an Hyperbola* is the line E F, drawn through the center C, parallel to the ordinates M N, M N.

Axis *of a Cylinder* is properly that quieſcent line about which the parallelogram forming the cylinder revolves. But in both right and oblique cylinders, that right line joining the centers of the oppoſite baſes, is called the axis of the cylinder.

Axis *of a Glaſs*, in optics, is a right line, connecting the middle points of the two oppoſite ſurfaces of the glaſs.

Axis *of Incidence*, in dioptrics, is a line perpendicular to the refracting ſurface in the point of incidence, and in the medium through which the ray of incidence paſſes. Thus, if A B (plate XII. *fig.* 2.) repreſent a ray of incidence, and *abcd*, a refracting ſurface, then will F B be the axis of incidence.

Axis, in optics, is that ray which is perpendicularly on the ſurface of the eye, and conſequently paſſes through its center.

Axis *of Oſcillation* is a right line parallel to the horizon, paſſing through the center about which a pendulum vibrates.

Axis *of a Planet* is a line drawn through the center of the planet, and about which it revolves.

Axis *of a Magnet* is a right line drawn through the magnet longitudinally, and terminated by its two poles.

Axis *of a Balance* is the line about which it moves.

Axis, in anatomy, is the tooth-like eminence in the ſecond vertebra of the neck.

Spiral Axis, in architecture, is the axis of a twiſted column drawn in a ſpiral form, in order to trace the circumvolutions on the ſurface.

Axis *of the Ionic Capital* is a line paſſing perpendicularly through the middle of the eye of the volute.

Axis *in Peritrochio*, one of the five mechanical powers uſed to raiſe weights to a conſiderable height.

It conſiſts of a peritrochium, or wheel, concentric with the baſe of a cylinder, and moveable together with it about its axis.

Becauſe, in this machine, the wheel and its axis move together, it is evident that, in one turn of the wheel, when the power P (ſee plate X. *fig.* 19.) deſcends a length equal to the circumference of the wheel, the weight W will be raiſed an height equal to the circumference A, by the winding of the rope, which carries the weight upon the ſaid axis.

And becauſe, when there is an equilibrium between two weights, as W and P, there muſt be a reciprocal proportion between the maſſes and velocities; W will be to P, as the circumference of the wheel is to that of the axis (ſuppoſing the thickneſs of the rope to be inconſiderable), or as the ſemi-diameter of the wheel to the ſemi-diameter of the axis; for the ſemi-diameters of different circles are in the ſame proportion to one another as their circumferences.

The axis in peritrochio may alſo be conſidered as a lever of the firſt kind; for the fulcrum will be in the middle of the axis A. If, therefore, lines be drawn from the middle of the axis to the power and weight, parallel to the horizon, the radius or ſemi-diameter of the wheel will be the diſtance of the power, and the radius of the axis the diſtance of the weight; and when theſe radii are reciprocally as the weight and power, the machine will be in equilibrio. The wheel and axis therefore is nothing more than a perpetual lever.

It has been already obſerved that the thickneſs of the rope carrying the weight, is ſuppoſed to be inconſiderable; but as this is never the caſe in practice, when the weight is conſiderable, it will be neceſſary to make a proper allowance for it; and this is done by adding the ſemi-diameter of the rope to the ſemi-diameter of the axis; for the weight really hangs half the thickneſs of the rope beyond the axis.

It is alſo neceſſary that the line of direction in which the power acts be a tangent to the wheel; for otherwiſe it will not produce the ſame effect, as the lever to which it is applied will be ſhortened. If a plumb line be applied to any part of the circumference of the wheel above the horizontal radius, it will form a chord-line, connecting two points in the circumference of the wheel; and if this chord be biſected by a radius drawn from the center, the part of that radius intercepted between the center and the chord will be the length of the lever on which the power acts in that poſition.

The machine repreſented by the figure, is a model (made by a ſcale of an inch to a foot) of ſuch an axle and wheel, as is often made uſe of to draw water out of a well, by means of a power drawing by a rope applied to the circumference of one of the wheels of the machine, or by preſſing down ſucceſſively the handles E, F, G, H, I, K, whilſt another rope or chain is wound up upon the axis, A or B, a bucket hanging at it inſtead of the weight W. Here, in the experiment, one pound hanging at the circumference of the biggeſt wheel C D, will keep in equilibrio 12 pounds hanging at the ſmalleſt axis A, or 6 pounds at the axis B, and only 3 pounds upon the circumference T V. In the ſame manner, when the weight hanging at the axis continues in the ſame place, and to be of the ſame quantity, viz. 12 pounds; then the power which, at the circumference of the wheel C D, is equal to 1 pound, muſt be equal to $1\frac{1}{2}$ pound, if to be applied at S R; but if it be applied at one of the handles at the diſtance of a $\frac{1}{4}$ of an inch from the circumference of the wheel C D (which is the ſame as if a new wheel was added of $\frac{1}{2}$ an inch more in diameter); then a power,

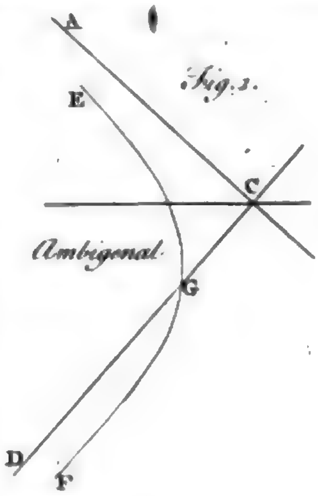
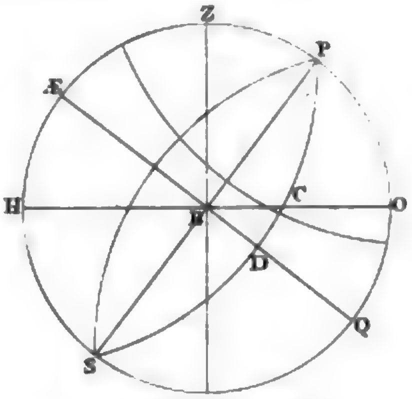


Fig. 1. Ambigenal.


Z
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Amplitude. Fig. 2

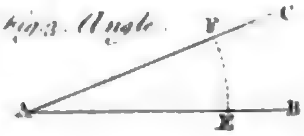

Fig. 3. Angle.

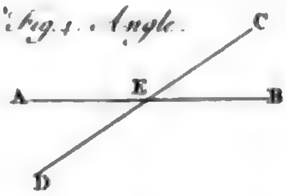

Fig. 4. Angle.

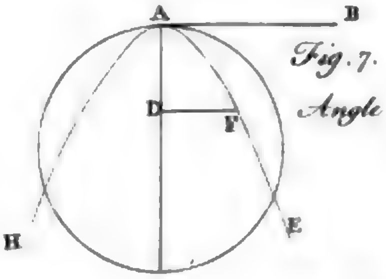

Fig. 7. Angle.

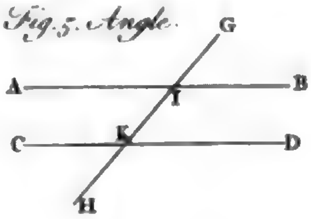

Fig. 5. Angle.

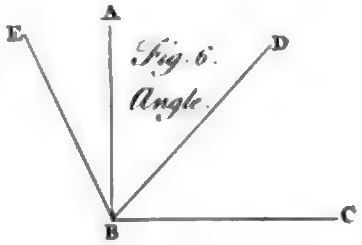

Fig. 6. Angle.

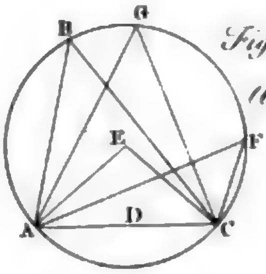

Fig. 8. Angle.

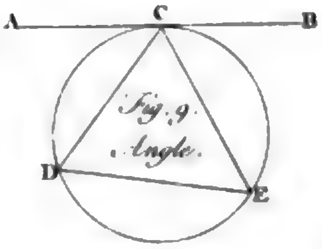

Fig. 9. Angle.

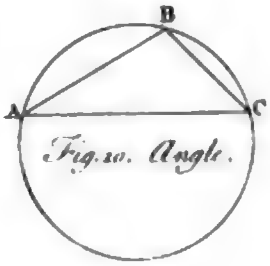

Fig. 10. Angle.

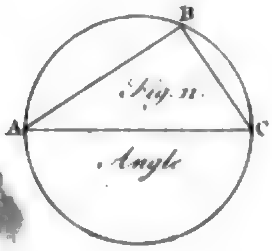

Fig. 11. Angle

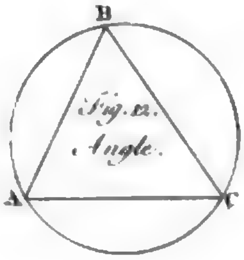

Fig. 12. Angle.

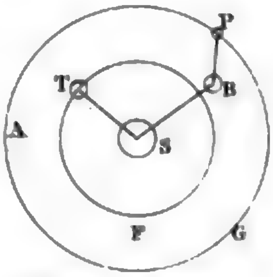

Fig. 13. Angle.

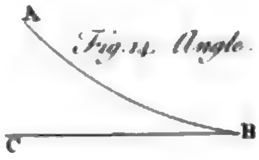

Fig. 14. Angle.

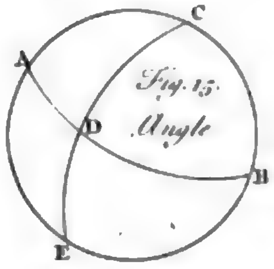

Fig. 15. Angle

Astronomical Sector

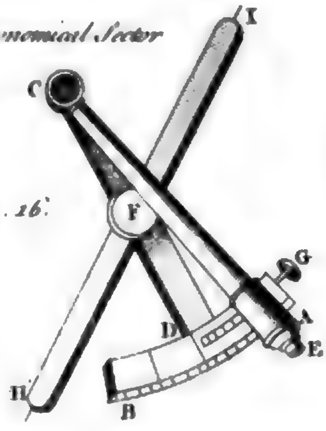

Fig. 16.

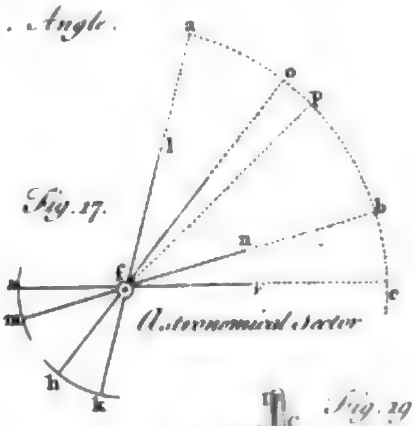
a
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Fig. 17. Astronomical Sector

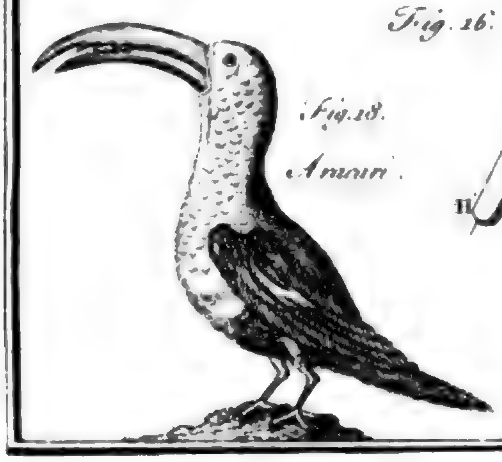


Fig. 18. Amouri.

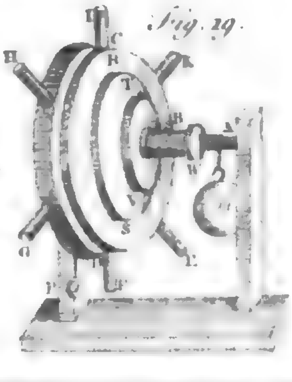


Fig. 19. Axis in Peritrochio

equal to no more than $1\frac{2}{3}$ of a pound, will keep the weight in equilibrio; and raiſe it, if its intenſity be increaſed ever ſo little.

Axis, in natural hiſtory, an animal of the deer kind, common in ſeveral parts of Africa. It is without horns; but has a tail reaching down to its hams. The female is leſs than the male; but they are both full of red, yellow, and white ſpots, except the belly, which is entirely white.

AXUNGIA, in a general ſenſe, denotes old lard, or the drieſt and hardeſt of any fat in the bodies of animals; but, more properly, it ſignifies only hog's lard. See the articles Fat and Lard.

Axungia *Vitri*, ſandiver, or ſalt of glaſs, a kind of ſalt which ſeparates from the glaſs while it is in fuſion.

AYEL, in law, a writ which lies where the grandfather was ſeized in his demeſne the day he died, and a ſtranger enters the ſame day, and diſpoſſeſſes the heir.

AYRY, or Aery *of Hawks*, a neſt or company of hawks, ſo called from the old French word *aire*, which ſignified the ſame.

AZAB, in the Turkiſh armies, a diſtinct body of ſoldiery, who are great rivals of the Janizaries.

AZALEA, in botany, a genus of plants, the flower of which conſiſts of a ſingle petal, divided at the ſummit into five ſegments: the fruit is a roundiſh capſule, formed of five valves, and containing as many cells: the ſeeds are numerous and roundiſh.

AZAZEL, the ſcape-goat, in Jewiſh antiquity. See Scape-Goat.

AZIMUTH, in aſtronomy, is the angle contained between the meridian and another great circle of the ſphere paſſing through the zenith and nadir; and when this vertical circle paſſes through the center of the ſun or of a ſtar, the meaſure of the angle ſo contained is ſaid to be the azimuth of the ſun or ſtar.

The word is Arabic, and ſignifies the ſame thing.

The azimuth is the complement of the eaſtern and weſtern amplitude to a quadrant.

As the method of finding the variation of the compaſs at ſea, depends entirely on having the ſun's azimuth, we ſhall here give the method of finding it, when the latitude of the place and the declination and altitude of the ſun are known.

If the latitude of the place and declination of the ſun be of one denomination, viz. both north or both ſouth, ſubtract the declination from 90 deg. but if the latitude and declination be of different denominations, viz. one north and the other ſouth, add the declination to 90 deg. then will the ſum or difference be the diſtance of the ſun from the pole, in this caſe equal to the arch SP (plate XIX. *fig.* 2.) wherein P repreſents the pole, Z the zenith, and S the place of the ſun. Now, in the ſpherical triangle SZP, we have given SZ the complement of the obſerved altitude, ZP the complement of the latitude, and PS the polar diſtance, to find the angle SZP the ſun's azimuth, which may be obtained by the following rule.

From half the ſum of the three ſides SZ, ZP, SP, ſubtract the ſide SP, being oppoſite to the angle ſought, and note the remainder; then ſet down the arithmetical complements of the ſides SZ, ZP, containing the angle ſought; under theſe write the ſines of the above found half ſum and remainder, then will half the ſum of theſe four logarithms be the coſine of half the required azimuth.

Example. Suppoſe the latitude be 51°. 32′. north, the declination of the ſun be 21°. 57′. north, and his altitude found by obſervation be 47°. 30′. what is his azimuth.

The operation by the logarithms.

42° : 30′	Compl. altitude — —	S.Co.Ar. 0.170319
38 : 28	Compl. latitude — —	S.Co.Ar. 0.206168
69 30	Compl. declination	
150 : 28	Sum	
75 : 14	Half Sum — — — —	S. — 9.985414
5 : 44	exceſs of the half ſum above *c.* dec.	S. — 8.999599
	Sum	19.361498
61°. 21′. — S *c* —	Half Sum	9.680749

and, therefore, 61°. 21′. being doubled, gives 122°. 42′. the ſun's azimuth from the north.

The above rule is no more than a logarithmetical application of the theorem demonſtrated by Ozanam, in the third vol. of his Mathematics, pag. 124, viz. "That in "a ſpherical triangle having two unequal ſides, the "rectangle of the ſines of theſe two ſides is to the "ſquare of radius, as the rectangle of the ſine of half "the ſum of the baſe and the difference of the ſides, and "the ſine of half the difference between the baſe and "the difference of the ſame ſides, to the ſquare of the "ſine of half the vertical angle."

But in calculations relating to the higher parts of aſtronomy, it will be better to uſe this theorem; viz. $sm + ncz = b$, wherein s and c repreſent the natural ſine and coſine of the latitude of the place, m and n thoſe of the ſun's altitude, b, the coſine of the polar diſtance, and z, the coſine of the azimuth, radius equal to unity: whence we get $z = \frac{b - sm}{nc}$. The reader will find this theorem inveſtigated in Simpſon's Fluxions.

Cor. If $b = 0$, or the ſun in the equinoctial, then $z = \frac{-sm}{cn} = t^{2} \times T$, where t and T are the reſpective tangents of the latitude and altitude; hence as radius (1): tangent of the latitude of the place, ſo is the tangent of the ſun's altitude to the coſine of the azimuth, reckoned from the elevated pole.

Magnetical Azimuth, an arch of the horizon, intercepted between the azimuth or vertical circle, paſſing through the center of any heavenly body and the magnetical meridian. The magnetical azimuth is found by obſerving the object with an azimuth-compaſs.

Azimuth-Compass, an inſtrument for finding either the magnetical azimuth or amplitude of an heavenly object.

The learned Dr. Knight invented ſome time ſince a very accurate and uſeful ſea-compaſs, which is at preſent uſed in the navy, and will be deſcribed under the article Compass. This inſtrument, with the following contrivance added by the ingenious Mr. Smeaton, anſwers the purpoſes of an azimuth and amplitude-compaſs.

The cover of the wooden box being taken off, the compaſs is in a condition to be made uſe of in the bittacle, when the weather is moderate: but if the ſea runs high, as the inner box is hung very free upon its centers, (the better to anſwer its other purpoſes) it will be neceſſary to ſlacken the milled nut, placed upon one of the axes that ſupports the ring, and to tighten the nut on the outſide that correſponds to it. By this means, the inner box and ring will be lifted up from the edges, upon which they reſt, when free; and the friction will be increaſed, and that to any degree neceſſary, to prevent the too great vibrations, which otherwiſe would be occaſioned by the motion of the ſhip.

To make the compaſs uſeful in taking the magnetic azimuth, or amplitude of the ſun and ſtars, as alſo the bearings of headlands, ſhips, and other objects at a diſtance, the braſs edge, deſigned at firſt to ſupport the card, and throw the weight thereof as near the circumference as poſſible, is itſelf divided into degrees and halves; which may be eaſily eſtimated into ſmaller parts, if neceſſary. The diviſions are determined by means of a cat-gut line, ſtretched perpendicularly with the box, as near the braſs edge as may be, that the parallax, ariſing from a different poſition of the obſerver, may be as little as poſſible.

Underneath the card are two ſmall weights, ſliding on two wires, placed at right angles to each other; which being moved nearer to, or farther from, the center, counterbalance the dipping of the card in different latitudes, or reſtore the equilibrium of it, where it happens by any other means to be got too much out of level.

There is alſo added an index at the top of the inner box, which may be put on and taken off at pleaſure; and ſerves for all altitudes of the object. It conſiſts of a bar, equal in length to the diameter of the inner box, each end being furniſhed with a perpendicular ſtile, with a ſlit parallel to the ſides thereof; one of the ſlits is narrow, to which the eye is applied, and the other is wider, with a ſmall cat-gut ſtretched up the middle of it, and from thence continued horizontally from the top of one ſtile to the top of the other. There is alſo a line drawn along the upper ſurface of the bar. Theſe four, viz. the narrow ſlit, the horizontal cat-gut thread, the perpendicular one, and the line on the bar, are in the ſame plane, which diſpoſes itſelf perpendicular to the horizon, when the inner box is at reſt, and hangs free. This index does not move round, but is always placed on, ſo as to anſwer the ſame ſide of the box.

When the ſun's azimuth is deſired, and his rays are ſtrong enough to caſt a ſhadow, turn about the wooden box, till the ſhadow of the horizontal thread, or (if the ſun be too low) till that of the perpendicular thread, in one ſtile, or the light through the ſlit in the other, falls upon the line in the index bar, or vibrates to an equal diſtance on each ſide of it, gently touching the box, if it vibrates too far: obſerve, at the ſame time, the degree marked upon the braſs edge by the cat-gut line. In counting the degree for the azimuth, or any other angle that is reckoned from the meridian, make uſe of the outward circle of figures upon the braſs edge; and the ſituation of the index bar, with regard to the card and needle, will always direct upon what quarter of the compaſs the object is placed.

But if the ſun does not ſhine out ſufficiently ſtrong, place the eye behind the narrow ſlit in one of the ſtiles, and turn the wooden box about, till ſome part of the horizontal, or perpendicular thread appears to interſect the center of the ſun, or vibrate to an equal diſtance on each ſide of it, uſing ſmoked glaſs next the eye, if the ſun's light is too ſtrong. In this method, another obſerver will be generally neceſſary, to note the degree cut by the nonius, at the ſame time the firſt gives notice that the thread appears to ſplit the object.

From what has been ſaid, the other obſervations will be eaſily performed; only, in caſe of the ſun's amplitude, take care to number the degree by the help of the inner circle of figures on the card, which are the complements of the outer to 90°; and, conſequently, ſhew the diſtance from eaſt or weſt.

The azimuth of the ſtars may alſo be obſerved by night; a proper light ſerving equally for one obſerver to ſee the thread, and the other the degree upon the card.

It may not be amiſs to remark farther, that, in caſe the inner box ſhould loſe its equilibrium, and, conſequently, the index be cut of the plane of a vertical circle, an accurate obſervation may ſtill be made, provided the ſun's ſhadow is diſtinct; for, by obſerving firſt with one end of the index towards the ſun, and then the other, a mean of the two obſervations will be the truth.

Plate XIV. *fig.* 2. is a perſpective view of the compaſs, when in order for obſervation; the point of view being the center of the card, and the diſtance of the eye two feet.

AB is the wooden-box.

C and D are two milled nuts; by means whereof the axis of the inner box and ring are taken from their edges, on which they move, and the friction increaſed, when neceſſary.

EE is the ring that ſupports the inner box.

GH is the inner box; and

I is one of its axes, by which it is ſuſpended on the ring E E.

The magnet or needle appears paſſing thro' the center, together with a ſmall brace of ivory, that confines the cap to its place.

The card is a ſingle varniſhed paper, reaching as far as the outer circle of figures, which is a circle of thin braſs; the edge whereof is turned down at right angles to the plane of the card, to make it more ſtiff.

O is a cat-gut line, drawn down the inſide of the box, for determining the degree upon the braſs edge.

PQRS is the index bar, with its two ſtiles and cat-gut threads; which being taken off from the top of the box, is placed in two pieces, T and V, notched properly to receive it.

W is a place cut out in the wood, ſerving as an handle.

AZIMUTH *Circles*, called alſo azimuths, or vertical circles, are great circles of the ſphere interſecting each other in the zenith and nadir, and cutting the horizon at right-angles.

Theſe azimuths are repreſented by the rhumbs on common ſea-charts, and on the globe they are repreſented by the quadrant of altitude, when ſcrewed in the zenith. On theſe azimuths is reckoned the height of the ſtars and of the ſun, when not in the meridian.

AZOGA SHIPS, are thoſe Spaniſh ſhips commonly called the quickſilver ſhips, from their carrying quickſilver to the Spaniſh Weſt Indies, in order to extract the ſilver out of the mines of Mexico and Peru. Theſe ſhips, ſtrictly ſpeaking, are not to carry any goods unleſs for the king of Spain's account.

AZONI, *αζωνοι*, in ancient mythology, a name applied by the Greeks to ſuch of the gods as were deities at large, not appropriated to the worſhip of any particular town or country, but acknowledged in general by all countries, and worſhipped by every nation. Theſe the Latins called *dii communes*. Of this ſort were the Sun, Mars, Luna, &c.

AZOTH, in ancient chemiſtry, the firſt matter of metals, or the mercury of a metal; more particularly that which they call the mercury of philoſophers, which they pretend to draw from all ſorts of metallic bodies.

The azoth of Paracelſus, which he boaſted of as an univerſal remedy, is pretended to be a preparation of gold, ſilver, and mercury.

AZURE, in a general ſenſe, the blue colour of the ſky. See SKY and BLUE.

AZURE, among painters, the beautiful blue colour, with a greeniſh caſt, prepared from the lapis lazuli, generally called ultramarine.

With greater propriety, however, azure ſignifies that bright blue colour prepared from the lapis armenus, a different ſtone from the lapis lazuli, though frequently confounded together. This colour is, by our painters, commonly called Lambert's blue.

AZURE, in heraldry, the blue colour in the arms of any perſon below the rank of a baron. In the eſcutcheon of a nobleman, it is called ſaphire; and in that of a ſovereign prince, Jupiter. In engraving, this colour is expreſſed by lines, or ſtrokes drawn horizontally.

AZURIUM, the name of a chemical preparation from two parts of mercury, one of ſulphur, and a fourth of ſal ammoniac, mixed in a mortar, put into a glaſs veſſel, and ſet over the fire till a bluiſh ſmoke ariſes, &c.

AZYGOS, in anatomy, a vein riſing within the thorax on the right ſide, having no fellow on the left; whence it is called azygos, or vena ſine pari.

It is extended through the right ſide of the cavity of the thorax, and being deſcended to the eighth or ninth vertebra, it then begins to keep the middle, and ſends forth on each ſide intercoſtal branches to the interſtices of the eight loweſt ribs; being then divided into two branches, of which the larger deſcends to the left, betwixt the proceſſes of the diaphragm, and is inſerted ſometimes into the cava, above or below the emulgent, but oftener joined to the emulgent itſelf. The other, which goes down on the right ſide, enters the cava, commonly a little above the emulgent, but is very ſeldom joined to the emulgent itſelf.

AZYMITES, azymitæ, in church-hiſtory, Chriſtians who adminiſter the euchariſt with unleavened bread.

The word is formed from the Greek, *α*, priv. and *ζυμη*, ferment.

This appellation is given to the Latin by the Greek church, becauſe the members of the former uſe fermented bread in the celebration of the euchariſt. They alſo call the Armenians and Maronites by the ſame name, and for the ſame reaſon.

AZYMOUS, ſomething unfermented, or made without leaven; as unleavened bread. Sea-biſket is of this kind; and therefore, according to Galen, leſs wholeſome than bread that has been fermented.

B.

B, The ſecond letter of the Engliſh and moſt other alphabets, ancient and modern, except the old Iriſh, where it is the firſt, and the Abyſſinian, in which it is the ninth.

B, among the ancients, was a numeral letter, and with the Hebrews and Greeks denoted 2; but with the Romans 300, and with a daſh over it 3000.

B. A. ſignifies batchelor of arts, B. L. batchelor of laws, and B. D. batchelor of divinity.

BAAL, or Bel, an Hebrew and Chaldaic word, which ſignifies lord, or mighty. It was the name of the idol of the Moabites and Phœnicians, and moſt of the nations that bordered upon the Jews. Perhaps the idolators pretended to adore the true God under the name and figure of Baalim. The Grecians, who were accuſtomed to take the eaſtern divinities for their own, called this idol Jupiter, and ſometimes Mars; but the Babylonians underſtood by it either the ſtars and hoſt of heaven, or ſuch kings and heroes whoſe memory they had conſecrated to poſterity by a religious worſhip. The Phœnicians adored the ſun under the names of Baal and Moloch. It is thought this idol was the firſt invented by ſuperſtition, and the original worſhip of idolatry. *Selden de Diis Syriis.*

BABBLING, among ſportſmen, is ſaid of hounds which are too buſy after they have found a good ſcent.

BABOON, in natural hiſtory, a large kind of ape, common in the Eaſt and Weſt Indies. The head is large, and the mouth furniſhed in a particular manner with whiſkers; the face is naked, but the back part of the head hairy. It has a very ſhort tail, and is of a dark olive-colour.

BABYLONISH, or Babylonian, ſomething belonging or peculiar to Babylon. Thus we meet with Babyloniſh epocha, hours, &c. See Epocha, Hour, &c.

BACCHANALIA, feaſts celebrated in honour of Bacchus, by the ancient Greeks and Romans.

Two of theſe feaſts were particularly remarkable, and diſtinguiſhed by the epithets *greater* and *leſſer*. The latter were held in the open fields during the autumn; but the former were celebrated in the city about the vernal equinox.

Both theſe feaſts were accompanied with games, ſpectacles, and theatrical repreſentations; and it was alſo at theſe feſtivals that the poets contended for the prize of poetry. Some of thoſe who were initiated into the Bacchanalia repreſented Silenus; others Pan; others Satyrs; and in this manner appeared in public day and night, counterfeiting drunkenneſs, dancing obſcenely, committing all kinds of licentiouſneſs and debauchery, and running over the mountains and through the foreſts, with horrible ſhrieks and howlings, crying out Ευοι Βακχε, or Ιω Βακχε.

Livy informs us, that, during the Bacchanalian feaſts at Rome, ſuch ſhocking diſorders were practiſed under the cover of the night, and which thoſe who were initiated were bound by the moſt horrid oaths to conceal, that the ſenate was obliged to interpoſe their authority, by ſuppreſſing them firſt at Rome, and afterwards throughout all Italy.

BACCHIUS, in ancient poetry, a kind of foot compoſed of two long and a ſhort ſyllable, as the word *āvārĭ*. It has its name from the god Bacchus, becauſe it frequently occurred in the hymns compoſed in honour of that deity.

BACCHUS, in mythology, a pagan deity, the inventor or god of wine. He is feigned to have been the ſon of Jupiter and Semele; and is ſaid to have been the firſt that yoked oxen to the plough.

BACCIFEROUS *Plants*, in botany, are ſuch as bear berries, or fruit covered with a thin membrane, wherein is contained a pulp, which grows ſoft and moiſt, when ripe, and incloſes the ſeed within its ſubſtance.

The word is Latin, and compounded of *bacca*, a berry, and *fero*, to bear.

Mr. Ray divides bacciferous trees into four kinds. 1. Such as bear a calicute, or naked berry; the flower and calix both falling off together, and leaving the berry bare; as the ſaſſafras trees, &c.

2. Such as have a naked but polypyreneous fruit; that is, containing two or more kernels or ſeeds within it; as the jaſminum, liguſtrum, &c.

3. Such as have a naked but polypyreneous fruit; that is, containing in it only one ſeed; as the arbutus, terebinthus, lentiſcus, &c.

4. Such as have their fruit compoſed of many acini, or round ſoft balls, ſet cloſe together like a bunch of grapes; as the ava marina, rubus vulgaris, rubus idæus, and the rubus minor fructu cæruleo.

BACHELOR, or Batchelor. See Batchelor.

BACK, in anatomy; ſee Dorsum.

Back-Astern, in rowing, is to row a boat or veſſel with her ſtern, or hinder-part, foremoſt, contrary to her uſual motion.

Back-Board *of a Boat*, a board ſtretching acroſs the hinder-part of any boat, behind the ſeats, for the paſſengers to lean againſt.

BACKING *the Sails*, in navigation, to arrange them in a ſituation that will force the ſhip to retreat, or move backwards: this is, however, only done in narrow channels, when a ſhip is carried along ſideways by the tide or current, and wants to avoid any thing that may interrupt her progreſs, as ſhoals, veſſels at anchor, &c. or in the line of battle, when a ſhip wants to be immediately oppoſite to another with which ſhe is engaged. See Fill, Shiver, and Veer.

Back-Bone. See Vertebra.

Back-Painting, the method of painting mezzotinto prints, paſted on glaſs, with oil-colours.

The art conſiſts chiefly in laying the print upon a piece of crown glaſs, of ſuch a ſize as fits the print.

In order to do this, take your print and lay it in clean water for two days and two nights, if the print be on very ſtrong, cloſe, and hard gummed paper; but if upon an open, ſoft, ſpungy paper, two hours will ſometimes ſuffice, or more, according as the paper is.

The paper or picture having been ſufficiently ſoaked, take it out and lay it upon two ſheets of paper, and cover it with two more; and let it lie there a little to ſuck out the moiſture.

In the mean time, take the glaſs the picture is to be put upon, and ſet it near the fire to warm; take Straſburg turpentine, warm it over the fire till it is grown fluid; then with a hog's-hair bruſh ſpread the turpentine very ſmoothly and evenly on the glaſs.

When this has been done, take the mezzo-tinto print from between the papers, and lay upon the glaſs; beginning firſt at one end, rubbing it down gently as you go on, till it lie cloſe, and there be no wind bladders between.

Then, with your fingers, rub or roll off the paper from the back-ſide of the print, till it looks black, i. e. till you can ſee nothing but the print, like a thin film, left upon the glaſs, and ſet it by to dry.

When it is dry, varniſh it over with ſome white tranſparent varniſh, that the print may be ſeen through it, and then it is fit for painting.

The utmoſt care will be neceſſary in rubbing or rolling the paper off the print, ſo as not to tear it, eſpecially in the light parts.

You may, inſtead of ſoaking your prints two days and two nights, roll them up and boil them for about two hours, more or leſs, according to the quality of the paper, in water, and that will render it as fit for rubbing, rolling, or peeling, as the other way.

This being done, and your oil colours prepared, ground very fine, and tempered up very ſtiff, lay on the backſide of the tranſparent prints ſuch colours as each particular part requires; letting the maſter-lines of the print ſtill guide your pencil, and ſo each particular colour will lie fair to the eye on the other ſide of the glaſs, and look almoſt as well as a painted piece, if it be done neatly.

The ſhadows of the print are generally ſufficient for the ſhadow of every colour; but if you have a mind to give a ſhadow by your pencil, then let the ſhadows be laid on firſt, and the other colours afterward.

In laying on colours in this kind of back painting, you need not be curious as to the laying them on ſmooth. This is not at all requiſite here, where the chief aim is only to have the colours appear well on the fore-ſide of the print; and therefore the only care to be uſed in this work, is to lay the colours on thick enough, that its body may ſtrike the colour of it plainly through the glaſs.

BACK-STAFF, a name formerly given to a ſea-quadrant invented by Capt. Davis; becauſe the back of the artiſt is turned towards the ſun at the time of obſervation. See *Davis's* QUADRANT.

BACK-STAYS, in naval affairs, ropes faſtened to the top-maſt-heads, and reaching down behind the maſt to the outſide of the ſhip, where they are drawn extremely tight: two of them are generally formed of one rope; the middle of which is fixed on the maſt-head: their uſe is to ſuſtain the top-maſts, and keep them upright when they are preſſed with a weight of ſail, againſt which they act with a counter-force. See LANIARD, STAY, and TOP-MAST.

BACON's *Philoſophy*, the philoſophy propoſed and recommended by lord Bacon.

That great genius was born in the year 1560, and gave marks in his youth of what his manhood would produce. Queen Elizabeth was an admirer of his remarkable ſagacity. He ſtudied the Ariſtotelian philoſophy at Cambridge; and, before he was ſixteen years of age, diſcovered the abſurdity of that jargon in vogue at that time. He afterwards applied himſelf to the ſtudy of the law; and his merit raiſed him to the dignity of lord chancellor, under king James I. He was accuſed of bribery; and, the king refuſing him protection, was fined by the houſe of lords, ſtripped of his chancellorſhip, and caſt into priſon. He was ſoon after reinſtated in his honours and fortunes; but what he had undergone gave him a diſlike to buſineſs, and increaſed his paſſion for ſtudy. At laſt he died aged 66 years, poor, and in very mean circumſtances.

No man has contributed more to the advancement of learning than lord-chancellor Bacon: he ſaw the imperfection of the philoſophy of the ſchools, and taught the only way to amend it. This great man, indeed, did not know nature; but he knew and pointed out all the ways that lead to her. He entertained an early contempt for what the univerſities called philoſophy; and did every thing in his power to prevent ſocieties, inſtituted for the improvement of human reaſon, from continuing to ſpoil it by a heap of impertinent terms, ſubſtantial forms, &c. which not only had made ignorance to be reverenced, but was, by a ridiculous mixture with religion, rendered ſacred.

He compoſed two works with a deſign to improve the ſciences, and carry them to perfection. In the firſt, intitled *de Augmentis Scientiarum*, he ſhews the ſtate of learning, and points out a method of carrying it to greater perfection; but adds, that we muſt never hope to carry our diſcoveries to any great length, unleſs other methods were purſued than thoſe then in uſe. He ſhews that the logic then taught in the ſchools, was fitter for wrangling than to direct the mind in its ſearch after truth. Ariſtotle, ſays he, from whom we have this art, has proceeded on wrong principles; he has made his phyſics conformable to his logic, inſtead of making his logic conformable to his phyſics; and thus overturning the order of nature, has ſubjected the end to the means.

To correct the faults in the common logic, Bacon compoſed a ſecond work, intitled *Organum Scientiarum*, wherein he has taught a new logic, the principal end of which is to ſhew how to make a good induction, as the end of Ariſtotle is how to make a good ſyllogiſm. Bacon looked on this as his maſter-piece, and ſpent eighteen years in compoſing it.

Nor was the cauſe of our errors hid from this great man; he ſaw that our ideas were operations of the mind; and that, in order to diſcover truth, they muſt be directed in a new method.

This advice he frequently repeats in the work juſt mentioned. But who, in an age ſo prejudiced in favour of the jargon of the ſchools, and the notions of innate ideas, liſtened to his doctrine? Who did not look on his new method of improving the human underſtanding, as a chimerical project? The method Bacon propoſed was too perfect to be accepted at once: errors of long ſtanding maintain their poſt with ſome obſtinacy; and the Carteſian philoſophy was embraced, becauſe it admitted ſome of the former errors. Beſides, lord Bacon's employments took up much of his time, and prevented him from carrying into execution himſelf the advice he gave to others: whereas Deſcartes gave himſelf up entirely to philoſophy; and, being a man of a very lively and fruitful imagination, has ſubſtituted in the room of the errors of the ſchools, others of a more ſeducing nature.

Lord Bacon's attention to the ſciences in general did not hinder him from applying himſelf to ſome in particular; and as he thought natural philoſophy the baſis of all the other ſciences, he principally applied himſelf to bring that to ſome degree of perfection: but in this he acted like ſome great architects, who, ſcorning to work after others, begin with pulling every thing down, and raiſe their building on a plan entirely new. He, like theſe, never thought once about embelliſhing or repairing what had been already begun by others; but propoſed to eſtabliſh a new ſyſtem of phyſics, without making any uſe of what had been left us by the ancients, whoſe principles he ſuſpected. To accompliſh this great deſign, he reſolved to publiſh a phyſical treatiſe every month; and began with one upon the Winds: he afterwards publiſhed one on Heat; another on Motion; and, at laſt, one on Life and Death. But as it was impoſſible for a ſingle man to give a complete ſyſtem of phyſics in general, with equal exactneſs, after having given directions to ſerve as a rule for thoſe who were deſirous of proceeding on his principles, he contented himſelf with drawing the out-lines of four other treatiſes, and furniſhed materials for them, in a work, intitled *Sylva Sylvarum*, wherein he has collected a vaſt number of experiments, to ſerve as a foundation for his new phyſics. In ſhort, before lord Bacon, nobody knew any thing of natural philoſophy; and all the experiments made ſince his time, ſeem to have been pointed out by this great genius.

His moral eſſays are much eſteemed; but they are wrote rather to inſtruct than entertain: an eaſy genius, a ſound judgment, the ſenſible philoſopher, and man of reflection, ſhine in theſe eſſays by turns. This was one of the fruits of the retreat of a man who had quitted the world, after having long ſupported a great ſhare in its proſperity and adverſity. There are alſo ſome very fine things in his book concerning the wiſdom of the ancients, wherein he has moralized the fables which compoſe the mythology of the Greeks and Romans.

He wrote, beſides, the Hiſtory of Henry VII. in which, notwithſtanding there are ſome traces of the bad taſte of his age, yet it abounds in judicious remarks, and ſhews he was a refined politician, as well as a great philoſopher.

BACULÆ, in fortification, a kind of portcullis, or gate, made like a pitfall with a counterpoiſe, and ſupported by two ſtrong ſtakes. It is uſually erected before the corps de guard, not far from the gate of a place.

BACULOMETRY, the art of meaſuring acceſſible or inacceſſible heights, by the help of ſtaves.

The word is formed from the Latin, *baculus*, a ſtaff; and the Greek, μετριω, to meaſure.

BADGE, in naval architecture, an ornament placed on the quarter of ſmall ſhips, very near the ſtern, containing either a window for the convenience of the cabbin, or the repreſentation of it: it is commonly decorated with marine figures, martial inſtruments, &c. See Quarter, and Stern.

BADGER, *Taxus*, or *Meles*, in natural hiſtory, the name of an animal very common in many parts of England.

It has a thick ſhortiſh body, with a very ſhort neck, and coarſe hair, nearly reſembling that of a hog. On the back it is of a paliſh yellow at the roots, in the middle brown or black, and yellow at the ends; inſomuch, that at firſt ſight the creature appears to be of a blackiſh grey. On the ſides and under the belly the hair is entirely of a pale yellow; and on the ſhoulders, legs, as well before as behind, and under the throat, he is quite black. From the top of the head there is a white line or ſtripe two inches broad; and below it, on each ſide the noſtrils, about the eyes, and farther than the ears, there is a black ſpace or ſtripe in the ſhape of a pyramid; and below that again, on both jaws, the hair is white, which render the whole head of a pied colour.

The tail is ſhort and thick, beſet with ſtrong longiſh hair, and the ears are ſhort, roundiſh, and reſemble thoſe of a rat. The eyes are ſmall in proportion to the body, and the muzzle is like that of a dog. The tongue is of a middle ſize, the legs ſhort, and the teeth like thoſe of a dog. The fore-feet are armed with very long claws, with which it makes holes in the earth; and the head is in ſhape nearly like that of a fox; for from a broad baſe, it ends in a ſharp muzzle, which renders it almoſt of a triangular figure. The jaws, or cheeks, are full and tumid, on account of the thickneſs of the muſcles; for which reaſon this creature bites very hard.

He lives upon beetles and other inſects; for in his ſtomach, which is very large, great numbers of theſe have been found, mixed with the roots of graſs. Some ſay he feeds upon apples and grapes; and that he is fond of rabbits, geeſe, fowls, and other birds; but, of this, little can be ſaid with any certainty. He has none of the groſs inteſtines; nor no blind gut, at leaſt none could be found; but the kidneys are pretty large. The greateſt peculiarity is a large orifice directly under the tail, above the paſſage for the excrements: it is a ſort of a bag, or purſe, which is hairy within, and full of a white ſubſtance of a thick conſiſtence. Sometimes it is very ſmall in quantity; and has no ſenſible ſmell. The external part of this purſe is covered with conglomerate glands on all ſides. Beſides this cavity, there are two larger glands near the anus, which are hollow within, and full of a ſort of fat of a ſtrong ſmell, which empty themſelves by two holes into the gut. The gall-bladder is long; and there are three biliary ducts which belong to three diſtinct veſſels; that is, there are three biliary paſſages that concur with the cyſtic duct.

The burrows that he makes in the earth are not only for his own ſafety, but for the ſake of getting his food; for he finds a great many inſects under the earth, as well as the roots of plants. The parts of England in which he chiefly abounds at preſent, are Eſſex, Suſſex, and ſome of the midland counties.

The fleſh of a badger is ſaid to be good eating, and to taſte like that of a boar. The fat is emollient, warm, and penetrating; and is thought to be good to eaſe pains in fits of the gravel.

White Badger, an animal ſometimes ſeen in New-York; from the tip of the noſe to the end of the tail is a foot and nine inches in length. The eyes are ſmall in proportion to the ſize, and the ears ſhort; the legs are alſo very ſhort with white claws. The whole body is covered with very thick hair, which is white on the back, and of a whitiſh yellow on the lower parts.

The badger of Surinam is about a foot and a half long, with ſhort ears, a roundiſh head, longiſh muzzle, and ſhort legs. The claws are black, long, and crooked; and the whole body, except the belly which is yellow, is covered with hair of a deep cheſnut colour inclining to black; but the fore-part of the head is not of ſo deep a colour; and the tail, which is as long as the body, is brown, and as it were ſtriped with yellow.

Badger, in old law books, a perſon licenſed to purchaſe corn at one place, and ſell it at another, without incurring the penalty of an engroſſer.

BADIANE, or Badian, the ſeed of a tree growing in China. It has the ſmell of aniſeed; and is uſed by the Chineſe to give their tea an aromatic taſte.

BÆTYLIA, anointed ſtones, worſhipped by the Phœnicians. They were commonly of a black colour, and conſecrated to ſome god, as Saturn, Jupiter, the Sun, &c.

The memory of Jacob's ſetting up the ſtone he had uſed for a pillow, pouring oil on the top of it, and calling the place Bethel, ſeems to have been preſerved under the bætulia, or anointed ſtones, of the Phœnicians. Damaſcius, a pagan writer in the time of Juſtinian, tells us, that he had ſeen on Mount Libanus, near Heliopolis in Syria, ſeveral of theſe ſtones, of which many wonderful things were reported.

BAFFETAS, or Baftas, a cloth made in the Eaſt-Indies, from coarſe white cotton thread. Thoſe of Surat are reckoned the beſt. They are from thirteen French ells and three quarters to fourteen long, and ſeven eighths broad. There are alſo ſome which meaſure but five ſixths of an ell, or even but half of an ell in breadth. Theſe narrow baffetas are called Orgagis, Gaudivis, Nerindes, and Labouis, according to the names of the places where manufactured.

There are alſo narrow white baffetas, which meaſure thirteen ells and an half in length, by half an ell in breadth. Broad white baffetas, fourteen ells, by three quarters.

Broad-brown and narrow-brown baffetas, are made of raw thread; that is, thread before it has been bleached. The former are fourteen ells long, by half an ell broad; the latter of the ſame length, and three quarters in breadth.

BAG, in commerce, a term ſignifying a certain quantity of ſome particular commodity; as a bag of almonds, for inſtance, is about three hundred weight; of aniſeſeeds, from three to four hundred, &c.

Bags are uſed, in moſt countries, to put ſeveral ſorts of coin in, either of gold, ſilver, braſs, or copper. Bankers, and others, who deal much in current caſh, label their bags of money, by tying a ticket or note at the mouth of the bag, ſignifying the coin therein contained, the ſum total, its weight, and of whom it was received. Tare is allowed for the bag.

Bag, among farriers, is when, in order to retrieve a horſe's loſt appetite, they put an ounce of aſſa-fœtida, and as much powder of ſavin, into a bag, to be tied to the bit, keeping him bridled for two hours, ſeveral times a day: as ſoon as the bag is taken off, he will immediately eat. The ſame bag will ſerve a long time.

BAGGAGE, is particularly uſed, in the military art, for the neceſſaries, utenſils, apparel, &c. of the officers and ſoldiers.

The baggage includes alſo women, children, ſuttlers, &c. The baggage-waggons before a march are appointed a rendezvous, where they are marſhalled by the waggon-maſter general, according to the rank the ſeveral regiments bear in the army. On a march, they are ſometimes ordered to follow the reſpective columns of the army, ſometimes to follow the march of the artillery, and ſometimes to make a column of themſelveſs. The general's baggage is commonly firſt. If the army march from the right, the baggage of that wing has the van; if from the left, the baggage of the left has the van. Each waggon has a diſtinguiſhing flag, to ſhew to what regiment it belongs. *Guilet.*

BAGNIO, an Italian word, ſignifying a bath: we uſe it for a houſe with conveniencies for bathing, cupping, ſweating, and otherwiſe cleanſing the body; and ſometimes for worſe purpoſes.

Bagnio is, in Turky, become a general name for the priſons where their ſlaves are incloſed, it being uſual in theſe priſons to have baths.

BAGNOLIANS, *Bagnolenſes*, in church-hiſtory, a ſect of heretics, who in reality were Manichees, though they ſomewhat diſguiſed their errors. They rejected the Old Teſtament, and part of the New; held the world to be eternal, and affirmed that God did not create the ſoul when he infuſed it into the body.

BAGPIPE, a muſical inſtrument of the wind kind, chiefly uſed in country places, eſpecially in the north: it conſiſts of two principal parts; the firſt a leathern bag, which blows up like a foot ball, by means of a port-vent, or little tube, fitted to it, and ſtopped by a valve: the other part conſiſts of three pipes or flutes, the firſt called the great pipe, or drone; and the ſecond, the little one; which paſs the wind out only at the bottom: the third has a reed, and is played on by compreſſing the bag under the arm, when full, and opening or ſtopping the holes, which are eight, with the fingers. The little pipe is ordinarily a foot long; that played on, thirteen inches; and the port-vent ſix.

BAHAR, or BARR, a weight uſed in Ternate, Mocha, in the Moluccas, Achem, and divers other parts of the Eaſt Indies.

There are two kinds, the great, wherewith ſpice is weighed, equivalent to 200 catis, at 26 taels to the cati, amounting to 481 pounds 4 ounces, Paris meaſure.

The little bahar ſerves for the weighing quickſilver, vermilion, ivory, ſilk, muſk, and other precious wares, containing likewiſe 200 catis, but at 22 taels to the cati, amounting to about 401 pounds ſeven ounces, Paris meaſure. The Chineſe Bahar is 300 catis, but each cati only equal to 16 taels.

BAHIR, a Hebrew term ſignifying famous or illuſtrious; but particularly uſed for a book of the Jews, treating of the profound myſteries of the cabala, being the moſt ancient of their rabbinical works.

BAIL, in law, the ſetting at liberty one arreſted, or impriſoned, upon an action, either civil or criminal, upon ſureties taken for his appearance at a day and place aſſigned; and is either common or ſpecial.

Common bail is in actions of ſmall prejudice, or ſlight proof, in which caſe any ſureties are taken.

Special bail is that given in caſes of greater moment, where it is required that the ſureties be ſubſidy-men at leaſt, and according to the matter in queſtion.

It was ſome years ago enacted, that no perſon ſhould be held to ſpecial bail in any action brought for leſs than ten pounds: but this is only obſerved as to writs iſſued out of the courts of Weſtminſter Hall; for the marſhal's court continues to arreſt and hold to ſpecial bail in actions exceeding forty-ſhillings.

By the indulgence of the common-law, all perſons might be bailed till they were convicted of the offence laid to their charge: but it is enacted, by ſtatute, that murderers, outlaws, houſe-burners, thieves, openly defamed, ſhall not be bailed. However, this ſtatute does not extend to the court of the king's-bench, which bails in all caſes whatſoever, and may bail even for murder, &c.

Clerk of the BAILS is an officer belonging to the court of the king's-bench: he files the bail-pieces taken in that court, and attends for that purpoſe.

BAILE, or BALE, in the ſea-language. The ſeamen call throwing the water by hand, out of the ſhip or boat's hold, bailing. They alſo call thoſe hoops that bear up the tilt of a boat, its bails.

BAILEMENT, in law, the delivery of things, whether writings or goods, to another, ſometimes to be delivered back to the bailer; that is, to him who ſo delivers them; ſometimes to the uſe of him to whom they are delivered; and ſometimes to a third perſon.

BAILIFF, an officer appointed for the adminiſtration of juſtice within a certain diſtrict, called a bailiwick.

BAILIFFS *Errant*, ſuch as are appointed by the ſheriff to go up and down the county, to ſerve writs and warrants, ſummon county-courts, ſeſſions, aſſizes, and the like.

BAILIFFS *of Franchiſes*, thoſe appointed by every lord within his liberty, to do ſuch offices therein, as the bailiff errant does at large in the county.

There are alſo bailiffs of foreſts, and bailiffs of manors, who direct huſbandry, fell trees, gather rents, pay quit-rents, &c.

BAILIWICK, that liberty which is exempted from the ſheriff of the county, over which liberty the lord thereof appoints his own bailiff, with the like power within his precinct, as an under-ſheriff exerciſes under the ſheriff of the county: or it ſignifies the precinct of a bailiff, or the place within which his juriſdiction is terminated.

BAIOCAO, a copper coin, current at Rome, and throughout the whole ſtate of the church, ten of which make a julio, and an hundred a Roman crown.

BAIRAM, in the Mahometan cuſtoms, a yearly feſtival of the Turks, which they keep after the faſt of Ramazan.

The Mahometans have two bairams, the great and the little.

The little bairam holds for three days, and is ſeventy days after the firſt, which follows immediately the Ramazan. During the bairam the people leave their work for three days, make preſents to one another, and ſpend the time with great manifeſtations of joy. If the day after Ramazan ſhould prove ſo cloudy as to prevent the ſight of the new moon, the bairam is put off to the next day, when it is kept, even if the moon ſhould ſtill be obſcured. When they celebrate this feaſt, after numerous ceremonies, or rather ſtrange mimicries, in their moſque, it is concluded with a ſolemn prayer againſt the infidels, to extirpate Chriſtian princes, or to arm them againſt one another, that they may have an opportunity to extend the borders of their law.

BAIT, among fiſhermen, implies a ſubſtance proper to be faſtened to a hook, in order to catch the different ſorts of fiſh.

Baits are of two ſorts. 1. The natural ones, or thoſe generally living, as maggots, bobs, frogs, &c. 2. Of the ſecond kind are all artificial baits, whether ſuch as imitate the living baits, or paſtes of ſeveral compoſitions and figures.

Sheep's blood and cheeſe are good baits in April; the bobs dried, waſps, and bees, are for May; brown flies for June; maggots and hornets for July; ſnails in Auguſt; graſshoppers in September; corn and bramble berries at the fall of the leaf: the red-earth worm is good for ſmall fiſh all the year round; and ſmall fiſh are good baits for pikes at all times.

There are ſeveral artificial baits for intoxicating of fowls, and yet without tainting or hurting their fleſh: for the greater ſort of land-fowls, the bait may be made thus: Take a peck, or a leſſer quantity, of wheat, rye, &c. with which mix two handfuls of nux vomica; boil them together till they are almoſt ready to burſt; ſtrew them upon the land where you deſign to take the fowl, and ſuch as eat thereof will be intoxicated, and lie as if dead. Small birds may be taken with only this alteration; inſtead of wheat, or the like grain, take hemp-ſeed, &c.

BAKING, the art of preparing bread, or of reducing meal of any kind, whether ſimple or compound, into bread. See BREAD, BISKIT, &c.

BAKING *of Porcelain*, or *China Ware*. See CHINA *Ware*.

BALANCE, or BALLANCE, *Libra*, one of the ſix ſimple powers in mechanics, principally uſed in determining the equality or difference of weights in heavy bodies, and conſequently their maſſes or quantities of matter.

The balance is of two kinds, the ancient and the modern.

The ancient, or Roman, called alſo the ſtatera Romana, or ſteel-yard, conſiſts of a lever or beam, moveable on a center, and ſuſpended near one of its extremities: the bodies to be weighed are applied on one ſide of the center, and their weight is ſhewn by the diviſion marked on the beam, where the weight, which is moveable along the lever, keeps the ſteel-yard in equilibrio. This balance is ſtill frequently uſed in weighing heavy bodies.

The modern balance now generally uſed, conſiſts of a lever or beam ſuſpended exactly in the middle, having ſcales or baſons hung to each extremity.

The lever is called the jugum or beam, and the two moieties thereof on each ſide the axis, the brachia or arms. The line on which the beam turns, or which divides its brachia, is called the axis; and when conſidered with regard to the length of the brachia, is eſteemed a point only, and called the center of the balance: the handle whereby it is held, or by which the whole apparatus is ſuſpended, is called trutina; and the ſlender part perpendicular to the beam, whereby either the equilibrium, or prepondency of bodies is indicated, is called the tongue of the balance. Thus, in *fig.* 14. Plate XV. *a b*, is the beam, divided into two equal brachia or arms by the white ſpot in the center, which is the axis or center of the balance, and *c*, is the tongue. The trutina, on which the axis is ſuſpended, is not repreſented in this figure, in order to render the other parts more conſpicuous.

It follows, from what has been obſerved therefore, that in the Roman balance, the weight uſed for a counterpoiſe is the ſame, but the points of application varies: in the common balance the counterpoiſe is various, and the point of application the ſame. The principle on which each is founded, may be very eaſily underſtood from the following obſervations, and the general properties of the lever. See Lever.

The beam A B (plate XIX. *fig.* 8.) is a lever of the firſt kind; but inſtead of reſting on a fulcrum, is ſuſpended by ſomething faſtened to C, its center of motion: conſequently the mechaniſm of the balance depends on the ſame theorems as the lever.

Hence, as the quantity of matter in known weight is to its diſtance from the center of motion; ſo is the diſtance of the unknown weight to its quantity of matter.

Or, becauſe when the balance moves about its center, the point B deſcribes the arch B *b*, while the point A deſcribes the arch A *a*; but theſe arches are to each other as their radii A C, B C; that is, as the velocities of the weight and power. If therefore the body ſuſpended at B, multiplied by its velocity, be equal to the body ſuſpended at A, multiplied by its velocity; or $B \times BC = A \times AC$, the balance will be in equilibrio.

Hence the nature and uſe of the ſteel-yard is eaſily known. Let A B (plate XIX. *fig.* 7.) repreſent an inſtrument of this kind; *d*, the trutina, or handle on which the beam turns; *k*, a ring on which the balance may be ſuſpended on a nail, or hook; *f*, the hook on which the body is to be weighed is hung; *c*, a collar or guard by which the hook *f* is faſtened to the beam; *g*, a moveable collar; *h*, a ſwivel; *i*, the counterpoiſe. From what has been ſaid, it evidently follows, that if the body to be weighed be faſtened to the hook *f*, and the whole ſuſpended by the ring *k*, the diviſion on which the counterpoiſe is placed to maintain an equilibrium in the ballance, will ſhew the weight of the body required; provided the weight of the counterpoiſe *i* be known, and the large diviſions 1, 2, 3, &c. be each equal to the diſtance between the center of the balance and the ſcrew which faſtens the guard *c*, to the ſhorter arm of the balance. It will alſo be neceſſary that the ſteel-yard itſelf, with its whole apparatus, excluſive of the counterpoiſe, be in equilibrio, when ſuſpended on the ring *k*. If the body to be weighed be heavier than the diviſions on the longer arm will indicate, the balance is turned the lower ſide upwards, and ſuſpended on the ring *l*, by which means the diviſions become ſhorter, becauſe the diſtance between that trutina *d*, and the ſcrew on which the guard *c* moves is leſs: the diviſions in the figure on this ſide extending to 17, whereas they extend only to ſix on the other. It will be unneceſſary perhaps to obſerve, that the ſame precaution, with regard to the center of gravity when the balance is ſuſpended, is alſo neceſſary when this ſide of the ballance is uſed, as we before mentioned with regard to the other.

We have already obſerved, that in the common ſcales, the two brachia or arms of the balance, *e f*, *e g*, (plate XIX. *fig.* 6.) are equal to each other, and conſequently equal weights placed in the ſcales *d*, *d*, will be in equilibrio, when the balance is ſuſpended on its center *e*, as in the figure where the ring at the extremity of the trutina *b*, is hung on the tapering rod *a*, *b*, fixed in the foot or baſis *c*.

The deceitful Balance, or that which cheats by the inequality of its brachia, is founded on the ſame principle as the ſteel-yard; E g. Take two ſcales of unequal weights, in the proportion of 9 to 10, and hang them to each end of a balance, ſo that they may be in equilibrio; if then you take any weights, which are to one another as 9 to 10, and put the firſt in the firſt ſcale, and the ſecond in the other ſcale, they will equiponderate: but the cheat is immediately diſcovered by changing the weights and commodity to be weighed from one ſcale to the other: and the true weight of the commodity is always equal to a mean proportional between what it weighed in each ſcale. For let *x* and *y* be put for the reſpective lengths of the unequal brachia, F the matter to be weighed, *a* its weight when in one ſcale, and *b*, when in the other: then $Fx = ay$ and $Fy = bx$, by the nature of the balance, divide the former of theſe equations by the latter, we have $\frac{Fx}{bx} = \frac{ay}{Fy}$, whence $\frac{F}{b} = \frac{a}{F}$, conſequently $F^2 = ab$, and $F = \sqrt{a \times b}$.

Aſſay Balance, a very nice balance uſed in docimaſtical operations, to determine exactly the weight of minute bodies.

This balance ſhould be made of the beſt ſteel, and of the hardeſt kind; becauſe that metal is not ſo eaſily ſpoiled with ruſt, as iron; and it is more apt than any other to take a perfect poliſh, which at the ſame time prevents the ruſt.

The ſtructure of the aſſayer's ſcale is little different from that of common ſcales, otherwiſe than by its nicety and ſmallneſs. The longer the beam of it is, the more exact may the weight of a body be found: however, ten or twelve inches are a ſufficient length. Let the thickneſs of it be ſo little, that two drams may hardly be hung at either of its extremities, without its bending: for the largeſt weight put upon it ſeldom exceeds one dram. The whole ſurface of this beam muſt be altogether without ornaments, which only increaſe the weight, and gather duſt, &c. The beam is ſuſpended in a fork, the two legs of which are ſteel-ſprings joined at top, but kept together below with a braſs, pliant claſp, parallel, and two lines and an half diſtant from each other. This claſp being taken off, and the legs of the fork being ſtretched out, the axis of the beam may be put into two holes made for that purpoſe at the ends of the legs, or be taken away from them. Let a very ſharp needle be fixed in the head of the fork, ſtanding perpendicularly downwards. if the fork is ſuſpended, and ſo long, as that it may almoſt touch the top of the tongue of the beam, put into the fork, when in equilibrio. This needle is the mark of the equilibrium; and, that the artiſts may be able to obſerve this, the legs of the fork muſt be broader in that place, and have an opening two or three lines wide; this fork may be adorned at pleaſure, provided the motion of the balance is not hindered by ſuch ornaments: then take two ſcales made of a thin plate of ſilver, one inch and an half in diameter, hanging on three ſmall ſilk-ſtrings, almoſt as long as the beam, tied together at top, with a ſilver hook, in form of an S, and hang them to the extremities of the beam: a ſmaller ſilver diſh, or blued ſteel, ſomewhat leſs than one inch in diameter, belongs to each of theſe ſcales. You firſt put into theſe diſhes, with a pair of pincers, the bodies to be weighed, or with a ſpoon or a ſmall ſhovel, when they are pounded, and then you put them into the ſcales; therefore the ſmall diſhes muſt be perfectly equal in weight. We uſe them, that bodies may be more conveniently put into and taken out of the ſcales, and that theſe, which are vaſtly thin, may not be bent or ſoiled, and thence rendered falſe by wiping.

This balance is ſuſpended on a moveable braſs or copper-ſupport, which conſiſts of a pedeſtal, and of a column ſet upon it about twenty inches high, at the top of which comes out at right-angles an arm one inch long. At the extremity of this arm, put a ſmall pulley three lines in diameter: another at the top of the column, and a third near the bottom of it: all which pullies muſt turn very eaſily on their axes. At the diſtance of one inch and a half below the upper arm, let another arm, one inch and a half long come out of the column at right-angles, having a hole through it two lines long, a quarter of a line broad, and placed perpendicularly below the pulley of the upper arm, to receive a ſmall plate, one inch and a half long; and of ſuch breadth and thickneſs, as that it may freely move up and down, and yet not have too much play within the hole. This plate muſt alſo have a ſmall hook at each extremity.

And as ſuch a balance will hardly ſtand ſtill in the open air, and becomes falſe when ſpoiled with duſt; it muſt be put together with its ſupport into a ſmall caſe, as repreſented in plate XV. *fig.* 12. having glaſſes, *a*, *a*, *a*, at top and all round it, that you may ſee what is within.

Manner of uſing the Aſſay BALANCE.—Paſs a ſilk ſtring over the three pullies of the ſupport, and tie it at its upper extremity to the ſmall hook introduced into the hole of the inferior arm; then put the ſupport in the middle of the ſmall caſe, and paſs the other extremity of the ſilk ſtring below, through a hole bored in the middle of the lower part of the frame, containing the window in the fore-part of the caſe, and faſten it to a ſmall weight of a cubic form. Suſpend the fork of the balance on the inferior hook of the plate. By this means, if you move backwards and forwards, the weight faſtened to the ſtring, placed upon the top of the drawer jutting out beyond the fore-part of the caſe, the balance within is either lifted up, or let down. But you muſt put the bodies to be weighed, and the weights themſelves, in the ſmall ſilver diſhes; and theſe, when loaded, into the ſcales, through the ſide-windows, which muſt be opened for that purpoſe. When any thing is to be added to or taken out of them, you do it with the ſmall pincers, or, if it is powder, with the ſmall ſhovel or ſpoon: but you muſt let the balance down every time any thing is to be added or taken away, that the ſcales may reſt upon the bottom of the caſe; and ſhut the windows before the balance is lifted up again, eſpecially if the air is not perfectly calm.

Hydroſtatic BALANCE, an inſtrument contrived to determine accurately the ſpecific gravity of both ſolid and fluid bodies.

As the learned Mr. Graveſande has greatly improved the common hydroſtatic balance, and rendered it more accurate and expeditious, we ſhall give the reader a deſcription of it, according to the improvements of this ingenious author.

The figure of this machine (plate XV. *fig.* 10.) repreſents the balance in its hydroſtatic uſe. We ſhall firſt deſcribe the machine; then ſhew the new contrived artifice for exactneſs; and, laſtly, give an inſtance of its univerſal uſe. V C G is the ſtand or pillar fixed in the table. From the top at A hangs, by two ſilken ſtrings, the horizontal piece or bar B B; from which is ſuſpended, by a ring at *i*, the fine beam of a balance *l*, which is kept from deſcending too low on either ſide, by the gentle ſpringing piece *z x y x*, fixed on the ſupporter M. The harneſs is annulated at *o*, to ſhew diſtinctly the perpendicular poſition of the examen, by the ſmall pointed index fixed above it. The ſtrings by which the balance is ſuſpended paſſing over two pullies, one on each ſide the piece at A, go down to the bottom on the other ſide, and are hung over the hook, by means of a ſcrew P, which is moveable about ¼th of an inch backwards and forwards; and therefore the balance may be raiſed or depreſſed as much: but if a greater elevation or depreſſion be required, the ſliding-piece S, which carries the ſcrew P, is readily moved to any part of the ſquare braſs rod V K, and fixed by means of a ſcrew.

The motion of the balance being thus provided for, the reſt of the apparatus is as follows: H H is a ſmall table fixed upon a piece D, under the ſcales *d* and *e*, and is moveable up and down in a long ſlit in the pillar above C, and faſtened at any part with a ſcrew behind. At the point at the middle of the bottom of each ſcale, is hung by a fine hook, a braſs wire *a d*, *a c*. Theſe paſs through two holes *m*, *m*, in the table; and to the wire *a d* is ſuſpended a curious cylindric wire *r s*, perforated at each end for that purpoſe. This wire *r s* is covered with paper graduated by equal diviſions, and is about five inches long. In the corner of the table at E, is fixed a braſs tube, in which a round wire *h l* is ſo adapted as to move neither too hard nor too freely by its flat head I: upon the lower part of this moves another tube Q, which has friction enough to cauſe it to remain in any poſition required; to this is fixed an index T, moving horizontally when the wire *h l* is turned about, and therefore may be eaſily ſet to the graduated wire *r s*.

To the lower end of the wire *r s* hangs a weight L, and to that a wire *p r* with a ſmall braſs ball *g* about ¼th of an inch in diameter. On the other ſide, to the wire *a c*, hangs a large glaſs bubble R to a horſe-hair. Let us, at preſent, ſuppoſe the weight L taken away, and the wire *p n* ſuſpended from S; and, on the other ſide, let the bubble R be taken away, and the weight F ſuſpended in its room at *c*. This weight F, we ſuppoſe to be ſuch as will keep in equilibrio with the ſeveral parts appended to the other ſcale, at the ſame time that the middle point of the wire *p n* is in the ſurface of the water in the veſſel N.

The wire *p n* is to be of ſuch a ſize, that the length of one inch ſhall weigh four grains. Hence it is evident, ſince braſs is eight times heavier than water, that for every inch the wire ſinks in the water, it will become half a grain lighter; and half a grain heavier for every inch it riſes out of the water: conſequently, by ſinking two inches below the middle point, or riſing two inches above it, the wire will become one grain lighter, or heavier.

And therefore, when the middle point is at the ſurface of the water in equilibrio, the index T be ſet to the middle point *a* of the graduated wire *r s*, and the diſtance on each ſide *a r*, and *a s* contain 100 equal parts; then, when in weighing bodies the weight is deſired to the hundredth part of a grain, it may eaſily be had by proceeding in the following manner.

Let the body to be weighed be placed in the ſcale *d*, and put the weights in the ſcale; and let theſe be ſo determined, that one grain more ſhall be too much, and one grain leſs too little. Then the balance being gently moved up or down by the ſcrew P, till the equilibrium be nicely ſhewn at *o*; and then, if the index T be at the middle point *a* of the wire *r s*, it ſhews the weights put into the ſcale *e* are juſt equal to the weight of the body.

But if the index T ſtand at any part between *a* and *r*, it ſhews the number of grains of the ſcale *e* were more than equal to the weight of the body in the ſcale *d*; becauſe the wire *p n* is now made lighter by ſinking below the middle point. Thus, ſuppoſe the weights put into the ſcale *e* were 1095 grains, and the index T cuts the 36 diviſion above *a*, it ſhews that 36 hundredth parts of a grain are to be added, or that the weight of the body is 1095, 36 grains.

On the other hand, had the index ſtood at 36, the diviſion below *a*, it would have ſhewn the weights in the ſcale *e* were more than equal to the weight of the body by 36 hundredths of a grain, and that then the weight of the body was 1094, 64 grains. By this method we find the abſolute weight of the body; the relative weight is found by weighing it hydroſtatically in water, as follows: Inſtead of putting the body in the ſcale *d*, as before, let it be appended with the weight F at the hook *e*, by a horſe hair as at R, ſuppoſing the veſſel of water O were taken away; then the equilibrium being made, the index T ſtanding between *a* and *r*, at the 36th diviſion ſhews the weight of the body 1095, 36 grains. As it thus hangs, let it be immerſed in the water of the veſſel O, and it will become lighter by much; the ſcale *e* will deſcend till the beam of the balance reſts on the ſupporter *z*. Then ſuppoſe 100 grains, put into the ſcale *d*, reſtored the equilibrium preciſely, ſo that the index T again pointed to the 36th diviſion above *a*; it is plain the weight of an equal bulk of water would, in this caſe, be exactly 100 grains. But if 100 grains in the ſcale *d*, cauſe it to preponderate a little, then, by turning the ſcrew P, the balance may be raiſed, till the wire *p n* becoming heavier, reſtores the equilibrio. Let now the index T cut the 6th diviſion above *a*; then $36-6=30$, which ſhews that the wire *p n* is now $\frac{3}{10}$ of a grain heavier than before; therefore the weight of the water is only 99, 7 grains: whence its gravity to that of the body is is as 99, 7 to 1095, 36, as required.

After a like manner may this balance be applied to find the ſpecific gravities of fluids, which will not be difficult to thoſe who apprehend what has been already ſaid.

In practice, it will be neceſſary to uſe great precautions in every particular; the wire *pn* ſhould be oiled, and then wiped as clean as poſſible; enough will remain to prevent the water adhering thereto: alſo the balance ought to be raiſed very gently, and when come to an equilibrium, ſhould be gently agitated, to ſee if it will come ſo again.

BALANCING, amongſt ſeamen, a ſingular method of contracting or reducing a ſail in a tempeſt, in contradiſtinction to reefing, which is common to all the principal ſails; whereas none are balanced but the mizen and main-ſails ſet on booms. Balancing the mizen is performed by rolling up a ſmall ſpace of it at the peek or upper-corner, and faſtening it to the mizen-yard. A boom-mainſail is balanced by tying a like portion of the outmoſt lower corner to the boom in the ſame manner, having firſt wrapped a piece of canvas round it to prevent its being cut or fretted by the line which faſtens it.

BALANI Marini, certain multivalve ſhells, uſually growing in cluſters on the ſhells of the larger ſort of the ſea ſhell-fiſh: ſometimes they are found large, looſe, and petrified, at a great diſtance from the ſea; in which ſtate they are diſtinguiſhed by the name of balanitæ.

The balanus is a ſea-ſhell fiſh, of an oblong figure, approaching to that of an acorn, open at the mouth or top, and compoſed of ſeveral portions, or valves, from ſix to twelve in number, not moveable or looſe, as in the other bivalve or multivalve ſhells, but fixed in one another by an intermediate ſubſtance: the animal inhabiting this ſhell is called a triton. See Triton.

BALASS, or Ballas, the name of a kind of ruby. See the article Ruby.

BALAUSTINE, large roſe-like flowers, of a deep red colour, ſet in long bell-ſhaped tough cups. They are the produce of the wild or double-flowered pomegranate tree, a low prickly tree or ſhrub, with long narrow leaves, bearing a browniſh acerb fruit, about the ſize of an orange; a native of the ſouthern parts of Europe; and cultivated in ſome of our gardens on account of the beauty and continuance of its flowers. The ſhops are uſually ſupplied with the dried flowers from abroad, tho' thoſe of our own growth do not appear to be anywiſe inferior to the foreign.

Balauſtine flowers are mildly aſtringent and corroborant; of a moderately rough and ſomewhat bitteriſh taſte, and of little or no ſmell or particular flavour. They give out their aſtringent matter, together with a pale red colour, both to water and rectified ſpirit: the extracts, obtained by inſpiſſating the tinctures, in which the active parts of the flower are concentrated, are pretty ſtrongly ſtyptic. The ſpirituous tincture is of a paler colour, and the extract in leſs quantity, and proportionably ſtronger in taſte, than the tincture and extract made with water. The ſpirituous extract, as well as the watery infuſion, ſtrikes an inky blackneſs with ſolution of chalybeate vitriol; a proof that the aſtringent matter of the balauſtine, after its ſeparation from the greateſt parts of the mucilaginous and other groſſer ſubſtances of the flower, is ſtill diſſoluble in water. *Lewis's Hiſtory of the Materia Medica.*

BALCONY, in architecture, a projecture in the front of a houſe, or other building, ſupported by pillars, or conſoles, and encompoſed with a baluſtrade: or it is a kind of open gallery, for people to ſtand in, to behold any public ſhow, or for taking the air in. They are uſually level with the firſt floor, and are made of wood, or iron.

BALDACHIN, of Baldaquin, in architecture, a building in form of a canopy, ſupported by pillars, and frequently uſed as a covering to inſulated altars. Some alſo uſe the term baldachin for the ſhell over a door.

BALE, in commerce, is ſaid of merchandizes packed up in cloth, and corded round very tight, in order to keep them from breaking, or preſerve them from the weather. Moſt of the merchandize capable of this kind of package, deſigned for fairs or exportation, ought to be in bales; and too much care cannot be taken in packing them, to prevent their being damaged. The bales are always to be marked and numbered, that the merchants to whom they belong may eaſily know them.

A bale of cotton yarn is from three to four hundred weight; of raw-ſilk, it is from one to four hundred; of lockram or dowlaſs, either three, three and a half, or four pieces.

Bale-Goods, among the Engliſh merchants, are all ſuch as are imported or exported in bales; but the French give that name to certain hard-wares, and other ſort of merchandize, which come to Paris, and are commonly made by bad workmen, of indifferent materials.

BALISTA, a machine uſed by the ancients for ſhooting darts; it reſembled in ſome meaſure our croſs-bow.

The word is Latin, ſignifying a croſs-bow; and is derived from the Greek, βαλλειν, to ſhoot, or throw.

Vegetius informs us, that the baliſta diſcharged darts with ſuch rapidity and violence, that nothing could reſiſt their force: and Athenæus adds, that Agiſtratus made one of little more than two feet in length, which ſhot darts five hundred paces.

Plate XIII. *fig.* 2. repreſents the baliſta uſed in ſieges, according to the Chevalier Folard: 2, the baſe of the baliſta; 3, 4, upright beams; 5, 6, tranſverſe beams; 7, 7, the two capitals in the upper tranſverſe beam; the lower tranſverſe beam has alſo two ſimilar capitals, but cannot be ſeen in this figure; 9, 9, two poſts or ſupports for ſtrengthening the tranſverſe beams; 10, 10, two ſkains of cords faſtened to the capitals; 11, 11, two arms inſerted between the two ſtrands, or parts of the ſkains; 12, a cord faſtened to the two arms; 13, darts which are ſhot by the baliſta; 14, 14, curves in the upright beams, and in the concavity of which cuſhions are faſtened, in order to break the force of the arms which ſtrike againſt them with great force when the dart is diſcharged; 16, the arbor of the machine, in which a groove or canal, perfectly ſtraight, is formed, and in which the darts are placed in order to their being ſhot by the baliſta; 17, the nut of the trigger; 18, the roll or windlaſs, about which the cord is wound; 19, an iron hook, by which the cord is drawn towards the center, and the baliſta cocked; 20, a ſtage or table on which the arbor is in part ſuſtained.

BALIVO Amovendo, in law, was a writ for removing a bailiff from his office, for want of having ſufficient land in his bailiwick to anſwer the king and his people, according to the ſtatute of Weſtminſter, 2 reg. Orig. 78.

BALK, among builders, is ſometimes uſed for the ſummer-beam of a houſe; ſometimes for the poles and rafters, which ſupport the roofs of barns, &c. and ſometimes for the beams uſed in making ſea-holds.

BALL, a ſpherical and round body, either naturally ſo, or turned into that form. There are balls of common wood, of box, of iron, &c.

The word ball is alſo uſed to ſignify ſome tools and inſtruments of ſeveral arts and trades, becauſe they bear ſome reſemblance to balls. Thus,

A ball, or ſphere, is an inſtrument uſed by the optic-glaſs-makers: it is a piece of copper, iron, or ſome compound metal, cut into the form of an hemiſphere, or half ball, to which a handle is joined with maſtic; with this inſtrument, thoſe workmen make the concave-glaſſes which ſerve for teleſcopes, or ſpying glaſſes, microſcopes, and other inſtruments of that kind.

There are balls of ſpheres of ſeveral ſizes, according to the radius of the focus which the glaſſes require. They uſe thoſe balls for concave-glaſſes, by applying them hard, and turning them upon the plate of glaſs, which is laid flat upon the former; contrary to what is done with regard to convex glaſſes, which are worked in a kind of baſon. This difference excepted, the ſame methods are uſed in forming, ſmoothing, and poliſhing both ſorts. Balls are alſo ſet upon a lath or turning-wheel, as are likewiſe baſons for the ſame purpoſe. See the article Turning.

Ball, in the military and pyrotechnical arts, is a compoſition of divers ingredients, generally of the combuſtible kinds, ſerving to burn, ſmoak, give light, &c.

Fire Balls, *globi incendiarii*, are bags of canvas filled with gun-powder, ſulphur, ſalt-petre, pitch, &c. to be thrown by the ſoldiers, or out of mortars, in order to fire the houſes, incommoding trenches, advanced poſts, or the like.

The preparations of fire balls, among the moderns, conſiſts

conſiſts of ſeveral operations, viz. making the bag, preparing the compoſition, tying, and, laſtly, dipping the ball.

The bags for this purpoſe are either oval or round.

The compoſition wherewith fire balls are filled, is various: To ten pounds of meal-gunpowder add two of ſalt-petre, one of ſulphur, and one of colophony; or, to ſix pounds of gunpowder, add four of ſalt-petre, four of ſulphur, one of powdered-glaſs, half a pound of antimony, as much camphor, an ounce of ſal-ammoniac, and four of common ſalt, all pulverized. Sometimes they even fill fire balls with hand granadoes.

For tying the fire balls, they prepare two iron rings, one fitted round the aperture, where the ball is to be lighted, the other near its baſe. A cord is tied to theſe rings in ſuch a manner, as that the ſeveral turns repreſent ſemi-circles of the ſphere cutting the globe thro' the poles: over the cords, extended according to the length of the ball, others are tied, cutting the former at right angles, and parallel to each other, making a knot at each interſection: laſtly, after putting in a leaden bullet, the reſt of the ſpace is filled with tow or paper. Thus compleated, the fire ball remains to be dipped in a compoſition of melted pitch four pounds, colophony two, and linſeed oil, or oil of turpentine, two; after dipping, they cover it round with tow, and dip again, till it be brought to the juſt diameter required.

Light **Balls**, *globi lucentes*, are ſuch as diffuſe an intenſe light around; or they are balls which, being caſt out of a mortar, or the hand, burn for ſome time, and illuminate the adjacent parts.

Luminous or light balls for the hand, are made of ground powder, ſalt-petre, brimſtone, camphor, and borax, all ſprinkled with oil, and mouldered into a maſs with ſuet, and this is wrapped up in tow, with a ſheet of ſtrong paper over it. To fire it, they make a hole into it with a bodkin, into which they put ſome priming that will burn ſlow. Its uſe is to be caſt into any works they would diſcover in the night-time.

For the larger light balls, or thoſe to be thrown to a greater diſtance, they melt equal quantities of ſulphur, turpentine, and pitch; and herein dip an earthen or ſtone ball, of a diameter much leſs than that of the mortar out of which the fire ball is to be caſt: then rolling it in gunpowder, and covering it round with gauze, they dip it again, and repeat the reſt till it come to fit the cavity of the mortar: laſtly, they ſprinkle it around with gunpowder. This, being once kindled, will ſtrongly illuminate all round the place where it is thrown, and give opportunity to examine the ſtate and condition thereof.

Smoak or Dark **Balls**, thoſe which fill the air with ſmoak, and thus darken a place to prevent diſcoveries.— To prepare a darkening ball, make an oval or ſpherical bag, melt roſin over the coals, and add an equal part of ſalt-petre not purified, alſo of ſulphur, and a fifth part of charcoal. The whole being well incorporated, put in tow firſt ſhred, and fill the bags with this compoſition, and dip it after the ſame manner as a fire ball.

Stink **Balls**, *globi fœtentes*, thoſe which yield a great ſtench where fired to annoy the enemy.

Their preparation is thus: Melt ten pounds of pitch, ſix of roſin, twenty of ſalt petre, eight of gun-powder, and four of colophony; to theſe add two of charcoal, ſix of horſe-hoofs cut ſmall, three of aſa-fœtida, one of ſtinking ſaracen, and any other offenſive ingredients. The reſt as in the former.

Sky **Balls**, *globi aerii*, thoſe caſt on high out of mortars, and which, when arrived at their height, burſting like rockets, afford a ſpectacle of decoration. Sky balls are made of a wooden ſhell, filled with various compoſitions, particularly that of the ſtars of rockets.

Theſe are ſometimes intermixed with crackers and other combuſtibles, making rains of fire, &c.

Water **Balls**, *globi aquatici*, thoſe which ſwim and burn a conſiderable time in the water, and at length burſt therein.

Theſe are made in a wooden ſhell, the cavity of which is filled with refined ſalt-petre, ſulphur, ſaw-duſt boiled in water of ſalt-petre, and dried; to which ſometimes other ingredients are added, as iron filings, Greek pitch, amber-duſt, glaſs powdered, and camphor. The ingredients are to be ground, mixed up, and moiſtened with linſeed oil, nut oil, olive oil, hempſeed oil, or petrol. At the bottom is placed an iron coffin, filled with whole gunpowder, that the ball may at laſt burſt with a greater noiſe: and, laſtly, the ball is, by the addition of lead, or otherwiſe, made of the ſame ſpecific gravity with water.

Ball *of a Pendulum*, the weight at the bottom. In ſhorter pendulums, this is called the bob. See Bob.

Ball, among the Corniſh miners, ſignifies a tin-mine.

Ball, among printers, a kind of wooden tunnel ſtuffed with wool, contained in a leather cover, which is nailed to the wood, with which the ink is applied on the forms to be wrought off.

The preſs-men, holding one of theſe balls with either hand, firſt daubs them on the ink-block, and afterwards on the forms, which retain the ink neceſſary to make an impreſſion.

Horſe **Balls**, among farriers, a kind of cordial medicine, adminiſtered in the form of balls, ſuppoſed of great virtue for feeding and ſtrengthening ſound, as well as healing and raiſing unſound, horſes.

Markham's horſe balls are preparation of aniſeeds, carthamums, elicampane, and other ingredients, wrought into a ſtiff paſte, and thence formed into balls. They are cleanſing and emollient, efficacious in colds, ſurfeits, and hard labour, and eſpecially uſeful where any of the chief viſcera are decayed: nothing raiſes a lean horſe ſo ſoon, being partly food and partly phyſic. *Ruſt Dict. Farr. Dict.*

Chewing **Balls** are thoſe which the horſe keeps champing or maſticating in his mouth, a conſiderable time, without ſwallowing. Theſe are chiefly uſed for a loſt appetite, a thing very incidental to horſes.

They are uſually made of aſa-fœtida, liver of antimony, juniper, bay-wood, and pellitory of Spain, beaten and incorporated into a maſs with verjuice. The method of adminiſtration is to wrap one of the balls in a linen cloth, and, having a ſtring faſtened to it, make the horſe chew it three or four hours at a time. *Ruſt Dict.*

Ball *Vein*, in mineralogy, a name given by the miners of Suſſex to a ſort of iron ore, common there, and wrought to conſiderable advantage. It yields not any great quantity of metal, but what it has runs freely in the fire; it is uſually found in looſe maſſes, not in the form of a ſtrata, and is often covered with one or more cruſts. It generally contains ſome ſparkling particles, and is uſually of a circular form in the perfect maſſes, thickeſt in the middle, and gradually thinner as it approaches the ſides. The ores of Suſſex in general are poor, but they require very little trouble in the working; ſo that a conſiderable profit is made annually from them.

Ball and Socket is an inſtrument made of braſs, with a perpetual ſcrew, ſo as to move horizontally, vertically, and obliquely; and is generally uſed for the managing of ſurveying inſtruments, and aſtronomical inſtruments.

BALLAD, or **Ballet**, a ſpecies of ſong, adapted to the lower claſs of people.

BALLANCE, or **Balance**, in mechanics; ſee Balance.

Ballance *of Trade*. See Trade.

Ballance *of a Clock or Watch*. See the articles Clock and Watch.

BALLAST, any heavy matter, as ſtones, gravel, iron, &c. thrown into the hold of a ſhip, in order to make her ſink a proper depth in the water, that ſhe may be capable of carrying a ſufficient quantity of ſail without overſetting.

The word is formed from the Flemiſh word, *belaſt*, which ſignifies the ſame thing.

BALLASTAGE, or **Lastage**; ſee Lastage.

BALLIAGE, in commerce, a ſmall duty paid to the city of London by aliens, and even denizens, for certain commodities exported by them.

BALLISTA. See the article Balista.

BALLOON, or **Ballon**, in a general ſenſe, implies any hollow body of a ſpherical form, be its compoſition or uſes what they will.

Balloon, in chemiſtry, is a large receiver of a round form, and very ſhort neck.

Balloon, in architecture, ſignifies a round ball or globe, placed on the top of a pillar, &c. by way of crowning.

Balloon, in pyrotechny, is a kind of bomb made of paſte-board, and played off in fire-works, either in the air or water, in imitation of a real bomb.

BALLOTADE, or Balotade, in the menage, the leap of a horſe between two pillars, or on a ſtraight line; made with juſtneſs of time, and with the aid of the hand and calves of the legs; and in ſuch a manner, that, when his fore-feet are in the air, he ſhews nothing but the ſhoes of his hinder feet, without yerking out.

BALLS, or Ballets, in heraldry, make a frequent bearing in coats of arms, though they are never called by thoſe names, but acquire other denominations from their ſeveral colours. Thus, when the colour is or, they are termed *beſants*; when argent, *plates*; when azure, *hurts*; when gules, *torteaux*; when vert, *pomeis*; when ſable, *ogreſſes*; when purple, *golpes*; when tanne, *oranges*; and when ſanguine, *guzes*.

BALLUSTER, in architecture, a kind of ſmall pillar uſed in balluſtrades.

BALLUSTRADE, a row or ſeries of balluſters joined by a rail, and fixed on a terras or the top of a building by way of ſecurity; as alſo to incloſe balconies, altars, fonts, ſtaircaſes, &c.

BALM, or Balsam; ſee Balsam.

Balm, or Baum, in botany; ſee Baum.

BALNEUM, a term much uſed by chemiſts to ſignify a veſſel filled with ſome matter, as ſand, water, or the like, in which others are placed for performing various operations that require leſs heat than a naked fire.

Balneum *Arenoſum*, or *Siccum*, a ſand, or dry heat; a veſſel filled with ſand, aſhes, or filings of ſteel.

Balneum *Mariæ*, or *Maris*, a water bath, or a veſſel filled with water, which is made to boil, and in which the veſſels containing the ingredients are placed.

Balneum *Vaporis*, a vapour bath, or when the veſſel containing the ingredients, on which the proceſs is to be performed, is heated by the vapour ariſing from boiling water.

BALSAM, *Balſamum*, an oily, reſinous, and odorous ſubſtance, flowing either ſpontaneouſly, or by inciſion, from certain plants, of great virtues in the cure of ſeveral diſorders.

Balsam *of Gilead*, or *of Mecca*, *Opobalſamum*, the moſt precious of all balſams; and commonly called balm of Gilead.

It is the produce of certain trees, which grew formerly in the valley of Jericho; but after the conqueſt of the Holy Land by the Turks, were removed to Grand Cairo, and afterwards to Mecca, where the balſam plantation is ſaid to be now guarded by Janiſſaries, and the reſinous juice collected for the ſultan only.

We are not to imagine, that what is ſold by the druggiſts under the name of this balſam, at no very great price, is the true ſort: it is either the native juice of another kind of tree, or what is more probable, a compoſition of balſam of copaiba with diſtilled oils, &c. Hence we meet with opobalſams very different from one another, or agreeing only in external appearance. There is, or at leaſt was lately, a ſpecimen of the genuine balſam in the royal apotheca at Dreſden, received by king Auguſtus, among other preſents, from the Grand Signior himſelf.

The true balſam is of a pale yellowiſh colour, clear and tranſparent, about the conſiſtence of Venice turpentine; of a ſtrong, penetrating, agreeable, aromatic ſmell, and a ſlightly bitteriſh pungent taſte: by age it becomes yellower, browner, and thicker, loſing by degrees, like eſſential oils, ſome of its finer and more ſubtile parts. To ſpread, when dropt into water, all over the ſurface, and to form a fine, thin, rainbow-coloured cuticle, ſo tenacious, that it may be taken up entire by the point of a needle, were formerly held infallible criteria of the genuine opobalſam. But it has been obſerved, that other balſams, when of a certain degree of conſiſtence, exhibit theſe phænomena equally with the genuine.

This balſam, according to Proſper Alpinus, is obtained from a ſmall ever-green tree or ſhrub, about the ſize of the privet or cytiſus, with flexible branches, and a few leaves, reſembling thoſe of rue, or rather of the lentiſk tree, ſet in pairs along a middle rib, with an odd one at the end. The branches are covered with two membraneous thin barks, the outermoſt of a reddiſh-brown colour, the inner greeniſh; the woody part is white. The flowers are of a purpliſh white colour, in ſhape like thoſe of acacia: the fruit is a ſmall reddiſh-black berry, containing yellow ſeeds.

The wood is ſaid to be inodorous, the bark fragrant and aromatic; the flowers highly odoriferous; the berries to be odorous, acrid, and bitter, and to yield a yellow liquor of the appearance of honey. The branches and dry berries have been ſometimes brought into Europe, and kept in the ſhops for medicinal uſe, the former under the name of *xylobalſamum*, the latter of *carpobalſamum*. But whatever ſmell or taſte theſe ſubſtances may have, when freſh, they have little of either as they come to us.

The precious balſam exſudes in very ſmall quantity, from ſlight inciſions made in the bark: according to the author abovementioned, it is at firſt white, of a very ſtrong penetrating ſmell, of the turpentine kind, but ſweeter and more fragrant, and of a bitter, acrid, aſtringent taſte. It looks in part turbid and thick, like the oil newly expreſſed from olives; afterwards it grows extremely thin, limpid, and light; its colour changes to a greeniſh, then to a gold yellow, and, by long keeping, to that of honey: it now grows thick like turpentine, and loſes much of its fragrance.

Inferior ſorts of balſam are ſaid to be obtained by boiling the branches in water. When the liquor begins to boil, a thin oil ariſes to the ſurface, and on continuing the coction a groſſer and thicker one.

Mr. Geoffrey obſerves, that a ſolution of balſam of Gilead, made in ſpirit of wine, turns milky on being poured into water, but does not depoſite any precipitate; and that this mixture is uſed in France as a coſmetic. He ſays an equal quantity of oil of almonds is previouſly mixed with the balſam; but this ingredient can be of no uſe, as it totally ſeparates and falls to the bottom, whilſt the balſam diſſolves in the ſpirit.

It is uſed in medicine to open obſtructions of the lungs, and to heal eroſions from acrimony, and the worſt kinds of ulcerations. It is alſo preſcribed in aſthmas, pleuriſies, and whenever expectoration is neceſſary, in internal bruiſes, and to cleanſe the urinary paſſages.

Balsam *of Tolu* is commonly of a thicker conſiſtence than the foregoing, and more of a browniſh colour. When freſh, it has an exceeding pleaſant ſmell, ſomewhat reſembling that of citrons.

It is ſaid to be the produce of New Spain, and to exſude in very hot weather from inciſions made in the bark of a ſmall tree of the fir kind, called tolu.

We have no particular deſcription of the tree which produces this balſam. Linnæus has given its generical characters, under the name of *toluifera*; and in theſe it differs greatly from the firs and pines, to which it is commonly reſembled. The balſam is one of the moſt elegant and grateful of the ſubſtances of this claſs, and does not loſe much of its fragrance when by age it grows conſiſtent. It yields very little eſſential oil in diſtillation, but impregnates the diſtilled water ſtrongly with its flavour. By diſſolving in this water, in a gentle warmth, a proper quantity of fine ſugar, we obtain a balſamic ſyrup, greatly ſuperior to that made in the common manner with a decoction of the balſam.

Its virtues are the ſame with that of Gilead, and is given in convulſions, and other diſorders of the breaſt, ſometimes in the form of pills, and ſometimes in electuary; but the beſt form of giving it is in emulſion, diſſolved in the yolk of an egg, and then mixed with water.

Balsam *of Copaiba*, *Cophabu*, *Copaiſ*, *Campaiſ*, *Copalyva*, or *Gamelo*, is obtained from a tree of the ſame name, growing in the Brazils, near Rio de Janeiro.

This balſam is of a pale yellowiſh colour, and thin conſiſtence. It is obſervable, that on mixing this juice with the watery ſpirit of ſal ammoniac, made by quicklime, a frothing, or effervеſcence, as it is called, enſues, ſtronger and of longer continuance than that produced by the ſame ſpirit with any other natural balſam: by this mark we may diſtinguiſh the genuine copaiba from the thin reſin of the turpentine or fir-tree, which is frequently mixed with or vended for it. This balſam is at preſent of very common uſe as a medicine.

It is obſervable alſo of this balſam, that on being diſtilled in a retort, it gives over towards the end of the operation, an oil of a fine blue colour, preceded by a limpid, and a yellowiſh or browniſh one. Diſtilled with water, it yields a large quantity of a limpid eſſential oil: from ſixteen ounces I have gained eight.

The copaiba-tree is one of the large foreſt trees of Brazil and ſome other parts of America. Mr. Ray calls it *Arbo balſamifera Brazilienſis fructu monos permo.* The leaves are roundiſh and oval, the flowers pentapetalous, the fruit a pod, containing a kernel like a filberd. The wood is of a deep red colour, and great hardneſs; and hence is employed in ornamental mechanic works, and is ſaid to be uſed alſo in dying. The balſam is extracted by making deep inciſions in the trunk of the tree, in the middle of the ſummer heats; if this operation is performed too early, no juice exſudes, in which caſe the wounds are for a time cloſed up. It is ſaid that twelve pounds of balſam iſſue from one tree in a few hours; but that after once bleeding, it never affords any more.

It is more deterſive and more fragrant than common turpentine; paſſes very quickly by urine, and greatly aſſiſts in cleanſing thoſe paſſages; for which reaſon it is frequently given in gonorrhæas, and all obſtructions and ulcerations of thoſe parts.

BALSAM *of Peru* is obtained from certain trees of Peru and Mexico, differing ſomewhat from one another in appearance, and ſomewhat alſo in the quality of their juices.

The balſam-tree deſcribed, by Piſo, under the name of *caburciba*, has ſmall leaves like thoſe of the myrtle, and a thick aſh-coloured bark, covered with a very thin red one; under this is lodged a yellowiſh balſam, that impregnates the whole ſubſtance of the bark, which by age becomes more and more fragrant. Hernandez deſcribes this balſam-tree, as having leaves like thoſe of the almond, and a thick bark like cork, from which the balſam flows upon wounding the outer thin rind. Plunkenet mentions a tree of the ſame kind in Virginia, by the name of *Arbor Virginiana, Piſaminis folio, Baccata Benzoinum redolens.*

There are three ſorts of balſam of Peru: 1. A colourleſs or pale yellowiſh, called white, in appearance ſomewhat reſembling the opobalſam, and like it of a ſtrong ſmell: this is the native juice, collected and preſerved in the ſame ſtate wherein it iſſues from the tree. Among us, it is rarely or never met with. 2. A dry balſam, or the foregoing inſpiſſated by the ſun's heat, in calabaſhes, or gourd-ſhells, in which it is ſometimes brought into Europe: this has ſomewhat of a reddiſh colour, and ſtill ſmells very agreeably. 3. The common or black Peruvian balſam of the ſhops. This ſort is artificially extracted from the bark, branches, and leaves of the tree, by cutting them in pieces, and boiling them in water. The balſam is ſaid to ſeparate, and ariſe to the ſurface, from whence it is taken off. A portion of the gummy or other matter of the plant which the water extracts, is retained by the balſam, and falls to the bottom upon diſſolving it in ſpirit of wine. Pomet and others report, that this balſam is counterfeited or ſophiſticated with mixtures of expreſſed oils and other ſubſtances: but happily the balſam of Peru will not in any degree mingle with thoſe oils; in which reſpect it differs from almoſt all the other reſinous bodies.

This balſam is of a thick conſiſtence, like honey; of a dark black colour in the maſs, but when ſpread thin of a clear reddiſh or yellowiſh brown, of an agreeable ſtrong ſmell, ſomewhat approaching to that of a mixture of benzoine and ſtorax, and of a bitteriſh pungent taſte, eaſily inflammable, not in the leaſt miſcible with water, nor rendered turbid or white on being agitated with that fluid. It becomes ſoluble in water, like the other balſams, by the mediation of yolk of eggs, or of ſugar; when diſſolved by the latter, it ſoon ſeparates from the water, whilſt the former keeps it much longer ſuſpended.

In diſtillation with water, it yields a ſmall quantity of a fragrant eſſential oil. Hoffman prepares alſo a grateful ſpirit, by drawing over ſpirit of roſes from a mixture of the balſam with half its weight of ſalt of tartar, divided by moiſt ſand. Diſtilled in a retort with an open fire, it affords a butter like that of benzoine, and oftentimes a conſiderable quantity even of concrete ſaline flowers, ſimilar to thoſe procured from that reſin.

It is of a heating and drying quality, and is frequently uſed externally in the cure of wounds. The perfumers alſo uſe it on account of its agreeable ſmell.

Oderiferous BALSAMS are a fragrant kind of unguents, generally of a thick conſiſtence, compoſed of ſome fatty, denſe juice, joined with ſome diſtilled oils of various kinds.

Boerhaave's method of preparing theſe balſams, is this: Melt an ounce of fine pomatum, in a China veſſel, over a ſmall and perfectly clear fire; then gradually add a dram of white wax, ſhaved into thin pieces: after theſe are perfectly blended together, remove the veſſel from the fire; and when the matter begins to thicken in cooling, drop in, by ſlow degrees, a dram of any of the fragrant eſſential oils; keep the whole continually ſtirring, all the time the oil is dropping in, that it may perfectly mix: after which, ſet the veſſel in cold water, that the whole matter, immediately condenſing by the cold, may keep in the oil and ſpirit. When the balſam is thoroughly cold, put it immediately up in veſſels of lead or pewter; and, if theſe are cloſe covered, it will keep perfect a great many years.

Inſtead of pomatum and wax, the expreſſed oil of nutmeg may be uſed in this proceſs, after it has been waſhed in water, till perfectly inſipid, white, and inodorous.

If theſe balſams are required to be of any colour, it may be eaſily given at pleaſure. A ſcruple of fine cochineal, in fine powder, will tinge the balſam of a fine purple; or the ſame quantity of the inſpiſſated juice of buckthorn berries, to a fine green; a little native cinnabar will turn it ſcarlet: turmeric, yellow; and ſmalt, to a beautiful blue. Any of theſe may be uſed at pleaſure, provided that they have no ill ſmell, or hurtful properties.

Theſe balſams are prepared as rich perfumes, to raiſe the languid ſpirit; and the nobleſt and richeſt of the eſſential oils ſhould therefore be uſed in them. The oils, principally directed by Boerhaave to this purpoſe, are thoſe of balm, calamus aromaticus, cinnamon, cedar, citron, cloves, jaſmin, lavender, white lillies, marjoram, mace, nutmegs, origanum, oranges, both thoſe of China and Seville; roſes, rhodium, and yellow ſaunders; to which may be added, the natural balſams of Peru and Gilead; theſe two being ſpontaneouſly fragrant without diſtillation. *Boerhaave's Chemiſtry.*

BALSAMICS, in pharmacy, ſoftening, reſtoring, healing, and cleanſing medicines, of gentle attenuating principles, very friendly to nature.

Theſe medicines, on account of their fine, ſubtile, and volatile oil, are not only grateful and agreeable to the conſtitution, but act upon the fluids, as well as the ſolids, of human bodies; diffuſing their virtues through every part, and ſupplying the blood and humours with a ſeaſonable reinforcement of ſulphureous, warm, and ethereal parts, increaſing their inteſtine motions, and conveying vigour to the vital juices.

Theſe medicines may be uſed with good ſucceſs, both internally and externally, in all diſeaſes of the head, nerves, ſpinal marrow, ſtomach and heart; ſuch as palſies, apoplexies, numbneſs and torpor of the ſenſes, weakneſs of the memory, difficulty of hearing, exceſſive weakneſs and faintings; they are alſo of ſingular ſervice in moſt diſorders of the ſtomach and inteſtines, and are exquiſitely adapted to the old and infirm.

BALSAMINA, *Balſamme*, in botany, the name of a genus of plants, whoſe flower is of the polypetalous anomalous kind; and is, in ſome ſpecies, four-leaved, and, in others, ſix-leaved. In the four-leaved flowers, the upper leaf is arched, and the lower hollowed, and terminated by a tail, and the two ſide leaves are large. In the ſix-leaved flowers of this genus, the flower leaf has no tail.

In both the piſtil, which is furniſhed with two leaves, occupies the middle part of the flowers, and at laſt becomes a fruit; ſometimes turbinated at one end, or both, and ſometimes emulating the ſhape of a pod, conſiſting of ſeveral muſcles, as it were, and endued with an elaſtic force, and flying open with great violence. The ſeeds it contains are fixed to the axis or placenta.

Mr. Miller has enumerated nine, and M. Tournefort nineteen ſpecies of balſamina.

The common white, red, and purple kinds of this plant will come up in common ground, without any artificial heat; and even be the ſtronger, and flower better, than if raiſed on hot beds. All the other varieties are raiſed from ſeeds ſown on hot beds in the ſpring, and afterwards planted into pots and borders. But the fine double large kind, or immortal eagle-flower, as it is called, requires to be ſet on a freſh hot bed, after it has been raiſed on one, in order to bring it forward; otherwiſe it will not get into flower till late in the year, and will not ripen its ſeeds: there are two kinds of this beautiful ſpecies; one brought from the Weſt Indies, and called the cock's-ſpur, which produces large and ſtrong plants, but flowers very late; the other is from China, and called the immortal eagle-flower, and is one of the fineſt annual plants we have, producing large double flowers, and continuing a long time in flower, if ſheltered from violent winds and rain. This produces ſeeds very well with us; but, after a few years, they are apt to degenerate into ſingle flowers. When the young plants are raiſed in a hot bed, and are to be planted out into pots, ſuch are always to be preferred as have ſtalks finely ſpotted with red; for theſe always produce red and double flowers. *Miller's Dict.*

BAMBOE, or BAMBOW, as they ſpell that word in the Indies, in botany, the name of a plant that multiplies very much by its root, from which ſprings a ramous or branchy tuft, after the manner of the European reeds; of which, as well as the ſugar-cane, it is a ſpecies. The Indian bamboe is the largeſt kind of cane hitherto known. It is of an extraordinary heighth and bigneſs when it bears its bloſſom; each ſhoot or cane is often, at the bottom, as large as a man's thigh, and decreaſes gradually to the top, where it bears a bloſſom or flower, like our reeds, in their proper ſeaſon.

The bamboe grows in all the maritime countries of the Eaſt Indies. Its leaves are like thoſe of the other canes or reeds, but neither ſo long nor ſo broad at their baſe. With theſe bamboes the Indians build their houſes, and make all ſorts of furniture, in a very ingenious manner. The wood is ſo hard and ſtrong, that they ſerve very well to make piles for ſupporting their little houſes, built over rivers, or in plains overflowed at ſome ſeaſons of the year with water. They alſo make, with this wood, all ſorts of utenſils for their kitchens and tables. The thickeſt bamboes ſerve to make the ſticks or poles, with which the ſlaves or other perſons carry thoſe ſorts of litters, which are called palanquins, ſo generally uſed in all the Eaſt. They alſo make of that wood a kind of pails, in which the water keeps extremely cool.

Don Ulloa, in his voyage to South America, has given us the following deſcription of the bamboe, great numbers of which grow near the river Guaiaquil. The bamboes, ſays he, are remarkable for their length and thickneſs, and the water contained in their tubes. Their uſual length is between ſix and eight fathoms; and tho' there is a difference in their ſize, the largeſt do not exceed ſix inches in diameter. The wood or ſide of the tube, is about ſix lines in thickneſs; ſo that when the bamboe is opened, it forms a board near a foot and an half in breadth: and hence it will not appear ſtrange that houſes ſhould be built of ſuch materials. From the time of their firſt appearance, till they attain their full perfection, when they are either cut down, or of themſelves begin to dry, moſt of their tubes contain a quantity of water; but with this remarkable difference, that at full moon they are entirely or very nearly full; and with the decreaſe of the moon, the water ebbs till at the conjunction little or none is to be found. This ingenious writer adds, that he has himſelf cut them at all ſeaſons; ſo that he advances nothing but what he knows to be true from frequent experience. He alſo obſerved, that the water during its decreaſe appeared turbid; but about the time of the full moon as clear as cryſtal. The Indians add another particular, that the water is not found in all the joints, one having water, and another not, alternately. This water is ſaid to be an excellent preſervative againſt the ill conſequence of any bruiſes; at leaſt it is drank as ſuch by all who come from the mountains, where ſuch accidents are unavoidable.

The bamboes being cut, they are left to dry; whence they acquire ſuch a degree of ſtrength, that they ſerve either for rafters, beams, flooring, or even maſts for balzas. Ships which load with cacao are alſo cieled with them, to preſerve the timbers from the great heat of that fruit. They are alſo uſed as poles for litters, and in an infinite number of other particulars.

BANANA-TREE, a ſpecies of the muſa or plantain, growing plentifully in both the Eaſt and Weſt Indies. Its leaves are near two yards long, and twelve inches wide. The fruit is ſix or ſeven inches long, and covered, when ripe, with a yellow and tender ſkin. It grows upon a ſtalk, bearing only one ſingle cluſter or bunch, which perhaps conſiſts of forty or fifty bananas. When the bunch is gathered, they cut off the ſtalk, otherwiſe it would bear no more fruit. The pulp of the fruit is as ſoft as marmalade, and of a very pleaſant taſte; and it is ſaid to be very nouriſhing, to excite urine, and provoke to venery.

BAND, in a general ſenſe, ſome ſmall, narrow ligament, wherewith any thing is bound, tied, or faſtened.

BAND, in architecture, a general name for any flat, low member, or moulding, that is broad, but not very deep.

BAND *of Soldiers*, in military affairs, thoſe who fight under the ſame flag or enſign.

BAND *of Penſioners* are a company of one hundred and twenty gentlemen, who receive a yearly allowance of one hundred pounds for attending on his majeſty on ſolemn occaſions.

BAND is alſo the denomination of a military order in Spain, inſtituted by Alphonſus XI. king of Caſtile, for the younger ſons of the nobility, who, before their admiſſion, muſt ſerve ten years, at leaſt, either in the army, or at court; and are bound to take up arms for the catholic faith againſt the infidels.

BAND, in ſurgery; ſee BANDAGE.

BANDAGE, in ſurgery, a fillet, roller, ſwathe, &c. applied to any part of the body.

That bandages are very uſeful, and even neceſſary, for curing the diſorders of the human body, is evident, not only from the teſtimonies of Hippocrates, Galen, and other eminent phyſicians, but alſo from this, that there can ſcarcely be any operation, in ſurgery, performed ſucceſsfully without their aſſiſtance: for ſhould a ſurgeon perform an operation with the greateſt care, but miſcarry in the application of the bandage, all his endeavours would be to no purpoſe; and more eſpecially in the treatment of wounds, fractures, luxations, and amputations: and we often find, that, in fractures and luxations, after a proper reduction of the parts, the cure depends more on a ſkilful application of the bandage to the part affected, than on the medicines: and in the caſe of violent hæmorrhages, a proper application of the bandage and compreſſes proves the moſt effectual and ſpeedy remedy, as muſt be acknowledged by every one who has any ſkill in ſurgery; not to mention that the applying and making a bandage, after a genteel and ready manner, is juſtly reckoned among the good qualifications of a ſurgeon, as it gains him the eſteem of the ſpectators, and the confidence of his patient, which is of great influence in forwarding the cure; for both the one and the other judge of a ſurgeon's other abilities by his performance on ſuch occaſions.

By a bandage we underſtand a piece of linen cloth, of a ſhape and ſize ſuitable to the part of the body it is to be applied to: they are ſometimes of a ſquare figure, not unlike a napkin; but generally they are long and narrow, when deſigned for fractures, luxations, and wounds; or for retaining compreſſes, plaiſters, lint, or the like. The French make a diſtinction betwixt a band and a bandage: by the firſt they underſtand the looſe cloth, before it be applied; and, by the other, the band, when applied to the body.

There are various kinds of bandages; ſome are peculiar to one, and others common to ſeveral parts of the body: ſome again are ſimple, and others compound. Thoſe are called ſimple which are made of one entire piece of linen, without any other pieces joined to them: with reſpect to theſe, we are to obſerve to make them of linen, cut according to the length of the whole piece, and commonly of three or four fingers in breadth, ſuitable to the part of the body they are to be applied to.

Theſe ſimple bandages may be rolled up at one or both ends, as the ſurgeon ſhall think more proper or neceſſary.

There are four different ways of applying the ſimple bandage, which are diſtinguiſhed by as many different names.

1. The circular or annular bandage is when the upper rounds come exactly over the undermoſt. 2. The obtuſe or aſcia, in French, *doloires*, when the rounds aſcend or deſcend from each other, in the form of a ſcrew.

3. The repent, in French, *rampant*, when the bandage is applied to the part affected in rounds ſeparate, and at a little diſtance from each other.

4. Reflex, called by the French, *renverſee*; when the bandage muſt be inverted, and turned back, as in thoſe applied to the legs, or other parts of the body, of different thickneſs.

The matter of which bandages are generally compoſed, is linen cloth; the neceſſary conditions of which are, firſt, that it be clean, partly for decency, and partly that it may not be offenſive to the wound: for, as Galen obſerves, a ſurgeon ought to ſtudy cleanlineſs and neatneſs, as well as uſefulneſs, in his dreſſings. Secondly, that it be not quite new, but wore for ſome time, which will render it more ſoft and ſmooth; for new cloth, by its hardneſs and aſperity, would iritate, inflame, and make the parts itch; at the ſame time, it ought not to be wore thin, becauſe that would make the bandage too weak, and ſubject to break. Thirdly, it ſhould be ſtrong, conſiſting of threads neither very coarſe, nor very fine; ſince the firſt will make it uneaſy to the patient, and the other will render it liable to ſtretch. Fourthly, it ſhould have no looſe threads, knots, or hems, nor any ſeams that can be avoided; but if the length of the bandage ſhould make ſeams neceſſary, they ſhould be as even and as few as poſſible. Fifthly, and laſtly, as to length and breadth required in a bandage, that muſt be left to the diſcretion of the ſurgeon.

BANDALEER, or Bandelfer, in military affairs, a large leathern belt, thrown over the right ſhoulder, and hanging under the left arm; worn by the ancient muſketeers, both for the ſuſtaining of their fire arms, and for the carriage of their muſket charges, which being put up in little wooden caſes, coated with leather, were hung, to the number of twelve, to each bandaleer.

BANDELET, or Bandlet, in architecture, any little band, or flat moulding, as that which crowns the Doric architrave.

BANDEROLL, a little flag, in form of a guidon, extended more in length than breadth, uſed to be hung out on the maſts of veſſels, &c.

BANDITTI, a term peculiarly denoting companies of highwaymen, common in Italy and France; but ſometimes alſo uſed, in a more general ſenſe, for robbers, pirates, out-lawed perſons, ruffians, &c.

BANIANS, a religious ſect in the empire of the Mogul, who believe a metempſychoſis, and will therefore eat no living creature, nor even kill noxious animals; but endeavour to releaſe them when in the hands of others.

The Banians are ſaid to be ſo fearful of having communication with other nations, that they break their cups, if one of a different religion has drank out of them, or even touched them. It is ſaid, that if they happen to touch one another, they purify and waſh themſelves before they eat, or enter their own houſes. They carry, hanging to their necks, a ſtone, called tamberane, as big as an egg, and perforated in the middle, through which run three ſtrings: this ſtone, they ſay, repreſents their great god, and upon that account they have great reſpect ſhewn them by all the Indians.

BANISHMENT, a kind of puniſhment, whereby the guilty perſon is obliged to leave the realm.

There are two kinds of baniſhment; one voluntary, and upon oath; the other upon compulſion, for ſome crime or offence: the former, properly called abjuration, is now ceaſed; the latter is chiefly enjoined by judgment of parliament, or other courts of juſtice.

By Magna Charta, none ſhall be outlawed, or baniſhed his country, but by lawful judgment of his peers, according to the law of the land, 9 Hen. III. 29.

BANK, in commerce, a common repoſitory, where many perſons agree to keep their money, to be always ready at their call or direction: or certain ſocieties or communities, who take the charge of other people's money, either to improve it, or to keep it ſecure.

There are banks of various kinds, and different in the nature of their conſtitutions and eſtabliſhments; ſome are inſtituted wholly on the public account, and put under the direction of the magiſtrates, as the famous bank of Amſterdam, where the money depoſited therein ſhall be always kept for the uſe of the proprietors, and ſhall never be let out for profit or advantage.

Payments made by aſſignments upon this bank, are valued from 3 to 6 per cent. above the payment of the money in ſpecie, ariſing from an opinion that the proprietors entertain of the equity of its adminiſtration; for judging themſelves ſecure, that their money lies always ready at hand, they ſeldom draw out large ſums, but make their mutual payments by transferring the ſums from one man's account to another.

A ſecond ſort of bank is ſuch as conſiſts of a company of monied men, who being duly eſtabliſhed, and incorporated by the laws of their country, agree to depoſite a conſiderable fund, or joint ſtock, to be employed for the uſe of the ſociety; as lending money upon good ſecurity, buying and ſelling bullion, gold and ſilver, diſcounting bills of exchange, &c.

A third ſort is the banks of private men, or partnerſhips, who deal in the ſame way as the former, upon their own ſingle ſtock or credit; and ſuch are the Lombard-ſtreet, or other bankers, as they are called. There are public banks eſtabliſhed in moſt of the trading cities of Europe, as in Venice, London, Paris, Amſterdam, Hamburgh, &c. The bank of Venice is the moſt ancient. It is eſtabliſhed by a ſolemn edict of the commonwealth, which enacts, that all payments of wholeſale merchandize, and letters of exchange, ſhall be in bank notes; that all debtors ſhall be obliged to carry their money to the bank, and all creditors receive their money from the bank; ſo that payments are performed by a ſimple transfer, from the one perſon to the other. In matters of retail, effective payments are ſometimes made, which do not diminiſh, but rather augment the ſtock, by reaſon of the liberty of withdrawing their money at pleaſure.

Bank, in natural hiſtory, denotes an elevation of the ground, or bottom of the ſea, ſo as ſometimes to ſurmount the ſurface of the water, or at leaſt to leave the water ſo ſhallow, as uſually not to allow a veſſel to remain a float over it.

In this ſenſe, bank amounts to much the ſame as flat, ſhoal, &c. There are banks of ſand, and others of ſtone, called alſo ſhelves, or rocks. In the North-ſea they alſo ſpeak of banks of ice, which are large pieces of that matter floating. *Aubin. Dict. Marin.*

Banks are uſually diſtinguiſhed by a buoy, poſt, or the like. On charts, ſand banks are uſually marked by little dots, and banks of ſtone, by croſſes. The colours of the buoys are alſo varied accordingly, ſand banks being denoted by light-coloured buoys, and rocks by black ones.

In large rivers, as the Elbe, &c. ſand banks, by high tides and inundations, are liable to change places; care is therefore taken to ſhift the buoys from time to time, to ſhew the true channel of the river.

An exact knowledge of the banks, their extent, and the depth of water on them, makes the moſt eſſential part of the ſcience of a pilot, and maſter of a ſhip; if the veſſel be large, and draw much water, great attention will be neceſſary to keep clear of the banks; on the contrary, if it be ſmall, the ſame banks afford a ſure aſylum, where it may brave the largeſt and ſtouteſt veſſels, which dare not follow it here. By means of this barrier, many ſmall craft have eſcaped its enemy.

BANKER, a perſon who traffics and negotiates in money; who receives and remits money from place to place by commiſſion from correſpondents, or by means of bills or letters of exchange.

In France, it is not requiſite that a man be a merchant, in order to carry on banking; for that trade is permitted to all ſorts of perſons, even to foreigners, ſo far as relates to foreign banking, or dealing by exchange.

In Italy, the trade of a banker does not derogate from nobility, which is the reaſon why moſt of the younger ſons of the quality apply themſelves to that employment, in order to ſupport their families. The monied goldſmiths, in the reign of king Charles the ſecond, firſt acquired this name. See BANK.

The Romans had two ſorts of bankers, whoſe office was much more extenſive than that of the bankers among us; theirs being that of public affairs, in whom were united the functions of a broker, agent, banker, and notory, managing the exchange, taking in money, aſſiſting in buying and ſelling, and drawing the writings neceſſary on all theſe occaſions.

BANKER, in bricklaying, a piece of timber whereon they cut the bricks.

The banker is ſix feet long, or more, according to the number of men to work at it, and nine or ten inches ſquare: it is to be laid on two piers of timber, three feet high from the floor they ſtand on.

BANKING, the making of banks to oppoſe the force of the ſea, rivers, or the like, and ſecure the land from being over-flowed thereby.

With reſpect to the water which is to be kept out, this is called banking; with reſpect to the land, which is thereby to be defended, imbanking.

BANKING, in a ſalt work, the raiſing a fence againſt the ſea, whereby its waters may be kept out, excepting ſo much as is neceſſary for the preparation of the ſalt.

BANKRUPT, any perſon, either man or woman, that by trading hath gotten other perſons goods into his or her hands, and concealeth himſelf from his creditors. It is not buying or ſelling of lands, but of perſonal things, that will make a perſon liable to be a bankrupt; nor is it buying only, but both. Every one that gets his livelihood by buying and ſelling in trade, may fall under a ſtate of bankruptcy upon his failing: but adventurers in the Eaſt India company, members of the bank of England, or of the South-ſea company, ſhall not be adjudged bankrupts, in reſpect of their ſtock: alſo no perſon concerned as receiver-general of the taxes, &c. ſhall be a bankrupt. If a merchant gives over trade, and ſome years after becomes not ſolvent for money owed while a merchant, he is a bankrupt; but if for new debts continued on new ſecurity, it is otherwiſe.

BANKRUPTCY, the failure, abſconding, and relinquiſhing of traffic in a merchant, a banker, or any other trader. See the article BANKRUPT.

The French make this difference between a bankruptcy and a failure, that the firſt is ſuppoſed voluntary and fraudulent, and the latter conſtrained and neceſſary, by means of accidents, &c. A failing, breaking, or ſtopping of payment, diminiſhes the merchant's credit; but does not note him with infamy, as bankruptcy does.

When a merchant fails to appear at the Exchange, without apparent reaſon, it is called a failing of preſence: the bankruptcy becomes open from the day he abſconds, or the ſeal is affixed to his effects.

BAN, or **BAN**, *Bannum*, or *Bannus*, in the feudal law, a ſolemn proclamation or publication of any thing. Hence the cuſtom of aſking, or bans, before marriage.

BANN, in military affairs, a proclamation made in the army by beat of drum, ſound of trumpet, &c. requiring the ſtrict obſervance of diſcipline, either for the declaring a new officer, or puniſhing an offender.

BANN *of the Empire*, an imperial proſcription, being a judicial puniſhment, wherewith ſuch as are acceſſary to diſturbing the public peace, are judged unworthy of the immunities and protection of the empire, and are outlawed or baniſhed, &c.

BANNER denotes either a ſquare flag, or the principal ſtandard belonging to a prince.

We find a multiplicity of opinions concerning the etymology of the word banner; ſome deriving it from the Latin *bandum*, a band or flag; others, again, from the German *ban*, a field or tenement, becauſe landed men alone were allowed a banner; and, finally, there are ſome who think it is a corruption of *panniere*, from *pannus*, cloth, becauſe banners were originally made of cloth.

BANNERET, an ancient order of knights, or feudal lords, who poſſeſſing ſeveral large fees, led their vaſſals to battle under their own flag, when ſummoned thereto by the king.

This order is certainly moſt honourable, as it never was conferred but upon ſome heroic action performed in the field. Anciently there being but two kinds of knights, great and little, the firſt were called bannerets, the ſecond batchelors; the firſt compoſed the upper, and the ſecond the middle nobility.

In France they are ſaid to tranſmit their degree to their poſterity: but in England it dies with them. We have had none of this order created in England, ſince the time of king Charles I. ſo that this order is now become extinct among us.

The form of the banneret's creation was this; on a day of battle, the candidate preſented his flag to the king, or general, who cutting off the train, or ſkirt thereof, and making it a ſquare, returned it again; the proper banner of bannerets, who, from hence, are ſometimes called knights of the ſquare flag.

BANQUET, in the menage, that ſmall part of the branch of a bridle that is under the eye, which being rounded like a ſmall rod, gathers and joins the extremities of the bitt to the branch, and that in ſuch a manner, that the banquet is not ſeen, but covered by the cope, or that part of the bitt that is next the branch.

BANQUET *Line*, an imaginary line drawn, in making a bitt along the banquet, and prolonged up or down to adjuſt the deſigned force or weakneſs of the branch, in order to make it ſtiff or eaſy.

BANQUET, or **BANQUETTE**, in fortification, a little foot bank, or elevation of earth, forming a path, which runs along the inſide of a parapet, upon which the muſketeers get up in order to diſcover the counterſcarp, or to fire on the enemy in the moat, or in the covert-way.

BANTAM-WORK, a kind of Indian painting, and carving on wood, reſembling Japan work, only more gay, and decorated with a great variety of gaudy colours.

Bantam work is of leſs value among the connoiſſeurs, though ſometimes preferred, by the unſkilful, to the true Japan work. Formerly it was in more uſe, and eſteem, than at preſent, and the imitation of it much practiſed by our japanners. There are two ſorts of Bantam, as well as of Japan work; as, in the latter, ſome are flat, lying even with the black, and others high and emboſſed: ſo, in Bantam-work, ſome are flat, and others in-cut, or carved into the wood, as we find in many large ſcreens; with this difference, that the Japan artiſts work chiefly in gold and other metals, and thoſe of Bantam generally in colours, with a ſmall ſprinkling of gold here and there: for the flat Bantam work is done in colours, mixed with gum-water, proper for the thing deſigned to be imitated. For the carved, or in-cut kind, the method of performing it is thus deſcribed by an ingenious artiſt: 1. The wood is to be primed with whiting and ſize, ſo often, till the primer lie near a quarter of an inch thick; then it is to be water-plained, i. e. rubbed with a fine wet cloth, and, ſometime after, rubbed very ſmooth, the blacks laid on, varniſhed up with a good body, and poliſhed well, though with a gentle hand. This done, the deſign is to be traced out with vermillion and gum-water, exactly in the manner wherein it is intended to be cut; the figures, trees, buildings, &c. in their due proportion; then the graver is applied, with other tools of proper ſhapes, differing according to the workman's fancy: with theſe he cuts deep or ſhallow, as is found convenient, but never deeper than the whiting lies; the wood being never to feel the edge of the inſtrument. Lines, or parts of the black, are ſtill to be left for the draperies, and other out-lines, and for the diſtinction of one thing from another; the rule being to cut where the white is, and leave the black untouched. The carving being finiſhed, then take to the pencil, with which the colours are laid into the cut work: after this, the gold is to be laid in thoſe places which the deſign requires; for which purpoſe, a ſtrong thick gum-arabic water is taken, and laid with a pencil on the work; and, while this remains wet, leaf-gold is cut with a ſharp ſmooth edged knife, in little pieces, ſhaped to the bigneſs and figure of the places where they are to be laid. Theſe being taken up with a little cotton, they dab them with the ſame cloſe to the gum-water, which affords a rich luſtre. The work thus finiſhed, they clear up the black with oil, taking care not to touch the colours. The European workmen ordinarily uſe braſs duſt, which is leſs bright and beautiful. *Park. Treat. of Japan*, c. 13. p. 37, & *ſeq.*

BAPTISM, in theology, the ceremony of waſhing; or a ſacrament whereby a perſon is admitted into the Chriſtian church.

The word is formed from the Greek, *βαπτιζω*, of *βαπτω*, to dip, or waſh.

Grotius is of opinion, that the rite of baptiſm had its original from the time of the deluge; immediately after which he thinks it was inſtituted in memory of the world having been purged by water. Some learned men think it was added to circumciſion, ſoon after the Samaritan ſchiſm, as a mark of diſtinction to the orthodox Jews. Spencer, who is fond of deriving the rites of the Jewiſh religion from the ceremonies of the Pagans, lays it down as a probable ſuppoſition, that the Jews received the baptiſm of proſelytes from the neighbouring nations, who were wont to prepare candidates for the more ſacred functions of their religion by a ſolemn ablution; that, by this affinity of ſacred rites, they might draw the Gentiles to embrace their religion, and the proſelytes (in gaining of whom they were extremely diligent) might the more eaſily comply with the tranſition from Gentiliſm to Judaiſm. In confirmation of this opinion, he obſerves; firſt, that there is no divine precept for the baptiſm of proſelytes, God having enjoined only the rite of circumciſion, for the admiſſion of ſtrangers into the Jewiſh religion. Secondly, that, among foreign nations, the Egyptians, Perſians, Greeks, Romans, and others, it was cuſtomary that thoſe who were to be initiated into their myſteries, or ſacred rites, ſhould be firſt purified by dipping their whole body in water. That learned writer adds, as a farther confirmation of his opinion, that the cup of bleſſing likewiſe, added to the paſchal ſupper, ſeems plainly to have been derived from a pagan original: for the Greeks, at their feaſts, had one cup, called *ποτηριον αγαθȣ δαιμονος*, the cup of the good dæmon, or god, which they drank at the concluſion of their entertainment, when the table was removed. Since then a rite of Gentile original was added to one of the Jewiſh ſacraments, viz. the paſſover, there can be no abſurdity in ſuppoſing, that baptiſm, which was added to the other ſacrament, namely circumciſion, might be derived from the ſame ſource. In the laſt place, he obſerves, that Chriſt, in the inſtitution of his ſacraments, paid a peculiar regard to thoſe rites which were borrowed from the Gentiles: for, rejecting circumciſion and the paſchal ſupper, he adopted into his religion baptiſm and the ſacred cup: thus preparing the way for the converſion and reception of the Gentiles into his church.

It is to be obſerved, under this head of Jewiſh baptiſm, that the proſelyte was not to be baptiſed, till the wound of circumciſion was perfectly healed; that then the ceremony was performed by plunging him into ſome large, natural, receptacle of water; and that baptiſm was never after repeated in the ſame perſon, or in any of his poſterity, who derived their legal purity from the baptiſm of their anceſtor.

In the primitive Chriſtian church, the office of baptiſing was veſted principally in the biſhops, and prieſts, or paſtors of the reſpective pariſhes: but, with the conſent of the biſhop, it was allowed to the deacons, and, in caſes of neceſſity, even to laymen, to baptiſe; but never, under any neceſſity whatever, was it permitted to women to perform this office. Nor was it enough, that baptiſm was conferred by a perſon called to the miniſtry, unleſs he was alſo orthodox in the faith. This became matter of great buſtle in the church; and hence aroſe the famous controverſy between Cyprian, and Stephen biſhop of Rome, concerning the re-baptiſing thoſe who had been baptiſed by heretics, Cyprian aſſerting that they ought to be re-baptiſed, and Stephen maintaining the contrary opinion.

What opinion the church had of the validity of baptiſm, when performed even by perſons not veſted with a ſacred character, appears from the remarkable ſtory of Athanaſius, who, when a boy, and being at play with his companions, was choſen biſhop, and others, perſonating catechumens, were baptiſed by him with the uſual ceremonies; which baptiſm was adjudged to be valid by Alexander, the then biſhop of Alexandria.

The perſons baptiſed were either infants, or adults. To prove that infants were admitted to the ſacrament of baptiſm, we need only uſe this argument; none were admitted to the euchariſt till they had received baptiſm: but in the primitive church, children received the ſacrament of the Lord's-ſupper; as appears from what Cyprian relates concerning a ſucking child, who ſo violently refuſed to taſte the ſacramental wine, that the deacon was obliged forcibly to open her lips, and pour it down her throat. Origen writes, that children are baptiſed for the purging away of the natural filth and original impurity inherent in them. We might add the teſtimonies of Irenæus and Cyprian; but it will be ſufficient to mention the determination of an African ſynod, held A. D. 254, at which were preſent ſixty-ſix biſhops. The occaſion of it was this: A certain biſhop, called Fidus, had ſome ſcruples concerning the time of baptiſing infants, whether it ought to be done on the ſecond, or third day, after their birth, or not before the eighth day, as was obſerved with reſpect to circumciſion under the Jewiſh diſpenſation. His ſcruples were propoſed to this ſynod, who unanimouſly decreed, that the baptiſm of children was not to be deferred ſo long, but that the grace of God, or baptiſm, ſhould be given to all, and moſt eſpecially unto infants.

As for the time, or ſeaſon, at which baptiſm was uſually adminiſtered, we find it to have been reſtrained to the two ſolemn feſtivals of the year; Eaſter and Whitſuntide: at Eaſter, in memory of Chriſt's death and reſurrection, correſpondent to which are the two parts of the Chriſtian life, repreſented and ſhadowed out in baptiſm, dying unto ſin, and riſing again unto newneſs of life; and at Whitſuntide, in memory of the Holy Ghoſt's being ſhed upon the Apoſtles, the ſame, in ſome meaſure, being repreſented and conveyed in baptiſm. It is to be obſerved, that theſe ſtated returns of the time of baptiſm related only to perſons in health: in other caſes, ſuch as ſickneſs, or any preſſing neceſſity, the time of baptiſm was regulated by occaſion and opportunity.

The place of baptiſm was at firſt unlimited; being ſome pond or lake, ſome ſpring or river, but always as near as poſſible to the place of public worſhip. Afterwards they had their baptiſteries, or, as we call them, fonts, built at firſt near the church, then in the church-porch, and at laſt in the church itſelf. There were many in thoſe days who were deſirous to be baptiſed in the river Jordan, out of reverence to the place where Our Saviour himſelf had been baptiſed.

The perſon to be baptiſed, if an adult, was firſt examined by the biſhop, or officiating prieſt, who put ſome queſtions to him; as firſt, whether he abjured the devil and all his works; ſecondly, whether he gave a firm aſſent to all the articles of the Chriſtian faith: to both which he anſwered in the affirmative. Concerning theſe baptiſmal queſtions, Dionyſius Alexandrinus, in his letter to Xiſtus, biſhop of Rome, ſpeaks of a certain ſcrupulous perſon in his church, who, being preſent at baptiſm, was exceedingly troubled when he heard the queſtions and anſwers of interrogatories were anſwered by his ſponſors, or god-fathers. Whether the uſe of ſponſors was as old as the Apoſtles days, is uncertain: perhaps it was not, ſince Juſtin Martyr, ſpeaking of the method and form of baptiſm, ſays not a word of them.

BAPTISMAL, ſomething belonging to baptiſm; thus we ſay, baptiſmal vow, fonts, preſents, &c.

BAPTISTS, in church hiſtory, the name by which the anabaptiſts love to diſtinguiſh themſelves. See ANABAPTISTS.

BAPTISTERY, the place in which the ceremony of baptiſm is performed. In the ancient Chriſtian church, it was one of the exedræ or buildings diſtinct from the church itſelf. So Paulinus, biſhop of Nola, ſpeaking of the magnificence of his friend Severus, ſays he built two churches and a baptiſtery between them both. It conſiſted of a προαυλιον οικον, a porch, or ante-room, where the perſons to be baptiſed made their confeſſion of faith, and an εσωτερον οικον, or inner-room, where the ceremony of baptiſm was performed. Thus it continued till the ſixth century, at which time the baptiſteries began to be taken into the church porch, and afterwards into the church itſelf.

The baptiſteries were very large and capacious, becauſe the ſtated times of baptiſm returning but ſeldom, there were uſually great multitudes to be baptiſed at the ſame time.

Some have confounded the baptiſtery, or place of baptiſm, with the font, in which the catechumen was plunged: but the baptiſtery was, properly ſpeaking, the whole houſe, or building, in which the font ſtood; which latter was only the fountain or pool of water in which the immerſion was performed.

Some learned men have obſerved, that anciently there was but one baptiſtery in a city, and that at the biſhop's church. Some remains of this ancient cuſtom are ſtill to be obſerved in ſeveral great cities of Italy: for Durantus informs us, that, at Piſa, Bononia, Orvieto, Parma, and even at Florence itſelf, they have but one baptiſtery and font for the whole city at this day. In length of time, baptiſteries were ſet up in country pariſhes, with the ſpecial allowance however of the biſhop.

BAR, in a general ſenſe, denotes a ſlender piece of wood or iron for keeping things cloſe together.

BAR, in courts of juſtice, an incloſure made with a ſtrong partition of timber, where the council are placed to plead cauſes. It is alſo applied to the benches where the lawyers or advocates are ſeated, becauſe anciently there was a bar to ſeparate the pleaders from the attorneys and others. Hence our lawyers, who are called to the bar, or licenſed to plead, are termed barriſters, an appellation equivalent to licentiate in other countries.

BAR, in law, a plea of a defendant which is ſaid to be ſufficient to deſtroy the plaintiff's action. It is divided into bar ſpecial, bar to common intendment, bar temporal, and bar perpetual. Bar ſpecial falls out upon ſome ſpecial circumſtances of the caſe in queſtion, as where an executor being ſued for his teſtator's debt, pleads that he had no goods in his hands at the day on which the writ was ſued out. Bar to common intendment is a general bar, which commonly diſables the plaintiff's declaration. Bar temporary is ſuch as is good for the preſent, but may afterwards fail; and bar perpetual is that which overthrows the plaintiff's action for ever. In perſonal actions, once barred, and ever ſo, is the general rule, but it is intended, where a bar is to the right of the cauſe, not where a wrong action is brought.

BAR, in heraldry, an ordinary reſembling the feſs, but much ſmaller.

It differs from the feſs only in its narrowneſs. The feſs is alſo confined to a ſingle place, whereas the bar may be placed in any part of the ſhield.

BAR, in horſemanſhip, implies the higheſt part of a horſe's mouth, between the grinders and tuſhes, that part only which lies under and at the ſide of the bars, retaining the name of gum.

BAR, in muſic, a ſtroke drawn perpendicularly acroſs the lines of a piece of muſic, including, between every two bars, a certain quantity, or meaſure of time, which is different, according as the muſic is either triple or common. In the former the meaſure of three crotchets is included, in the latter four. The principal uſe of bars is to regulate the beating of time.

BAR, in hydrography, implies a bank of ſand, gravel, &c. lying before the mouth of a river, harbour, &c. which always obſtructs the paſſage, and ſometimes totally prevents the navigation.

BAR-MASTER, among miners, the perſon who keeps the diſh, or gage, for meaſuring the ores.

BAR-SHOT. See SHOT.

BARACKS. See BARRACKS.

BARALIPTON, among logicians, the firſt indirect mode of the firſt figure of ſyllogiſm.

When the two firſt propoſitions are general, and the third particular, the middle term being the ſubject in the firſt propoſition, and the predicate in the ſecond, the ſyllogiſm is ſaid to be in baralipton. The following is of this kind:

BA. Every evil ought to be feared;
RA. Every violent paſſion is an evil;
LIP. Therefore ſomething that ought to be feared is a violent paſſion.

BARALOTTS, *Baralotti*, a ſect of heretics at Bologna in Italy, among whom all things, even their wives and children, were in common. They were alſo called *obedientes*, or compliers, becauſe they readily complied with every thing that tended to promote debauchery.

BARANGI, officers among the Greeks of the Lower Empire, who were intruſted with the keys of the city gates, where the emperor reſided. Codinus ſays, they were officers who kept guard at the door of the emperor's bed-chamber, or dining room.

BARBACAN, or BARBICAN, properly ſignifies the outer wall, or exterior defence of a city or fortreſs.

BARBACAN alſo implies a fort at the entrance of a bridge, or in the out-let of a city, having a double wall with towers.

It likewiſe denotes an aperture made in the walls of a fortreſs, to fire through upon the enemy.

BARBACAN, in architecture, is a canal or opening left in the wall, in order to give room for the water to run in and out, when buildings are erected in places liable to be overflowed, &c.

BARBADOES-TAR, *Petroleum Barbadenſe*, in the materia medica, a fluid bitumen, or mineral oil, of a reddiſh colour, and thick conſiſtence, approaching to that of treacle, or common tar. It is found in ſeveral of our American dominions, eſpecially in that iſland from which it receives its name.

This bitumen is greatly eſteemed by the Americans as a ſudorific, and frequently given in diſorders of the breaſt. It is alſo uſed as an external diſcutient and antiparalytic.

BARBARA, in logic, is a name given by the ſchoolmen to the firſt mode of the firſt figure of ſyllogiſms.

A ſyllogiſm, in barbara, is that whoſe propoſitions are all univerſal and affirmative; the middle term being the ſubject of the firſt propoſition, and the attribute in the ſecond: as,

BAR. Every wicked man is miſerable;
BA. All tyrants are wicked men;
RA. Therefore all tyrants are miſerable.

BARBARISM, in grammar, an offence againſt the purity of ſtyle or language; or a hard and coarſe expreſſion, never uſed by polite authors.

BARBE, a name uſually given to a Barbary horſe, greatly eſteemed for its beauty and ſwiftneſs.

BARBE, in the military art, is a term applied to the firing of cannon. Thus, to fire in barbe, is to fire the cannon over the parapet, inſtead of firing through the embraſures. The parapet muſt not be above three feet and a half high, otherwiſe it will be impoſſible to fire in this manner.

BARBE, among our anceſtors, ſignified the armour of a knight's horſe.

BARBEL, *Barbus*, the name of a river fiſh, and ſo called from its having a barb or beard under its noſe.

BARBERY, in botany; ſee BERBERIS.

BARBLES, or BARBS, in farriery, are ſmall excreſcences under the tongue, and which may be diſcovered by drawing it aſide, and cured by cutting them cloſe off, and waſhing the part with brandy, or ſalt and water.

BARCALAO, a ſpecies of cod reſembling that of Newfoundland, caught in ſeveral parts of the South-ſea, particularly on the coaſt of the iſland of Juan Fernandes.

BARCA-LONGA, a ſmall coaſting veſſel in Spain, fitted with pole-maſts, (i. e. ſingle maſts, without any top-maſt or upper-part) and high ſquare ſails, called lug-ſails.

BARD, a poet among the ancient Gauls and Britons, who ſung the praiſes of heroes, in order to recommend virtue, and compoſe the diſſenſions among mankind.

Some writers have confounded the bards with the druids; but this is a miſtake. They had their name from their office of chanting hymns, which were accompanied with muſical inſtruments, and conſidered as the dictates of their gods; ſo that it is no wonder they were held in the higheſt eſteem. It is even ſaid that they could at any time ſtop whole armies at the point of engaging by their interpoſition.

BARDANA *Major*, burdock or clotbur, in botany, a biennial plant, common by road ſides, ſufficiently known by its ſcaly heads or burs: the leaves are very large, ſhaped ſomewhat like a heart, of a deep green colour above, and whitiſh underneath; the ſeeds flatted, nearly oval, ſomewhat crooked, ſlightly ſtriated, of a dark brown or blackiſh colour: the root large, ſtraight, browniſh on the outſide and white within, compoſed of a thick cortical part, and a ſpongy medullary ſubſtance, with more or leſs of a woody ſeptum between them.

The roots of burdock have very little ſmell, and a weak taſte, chiefly ſweetiſh, mixed as it were with a ſlight bitteriſhneſs and roughneſs. Boiled in water, they impart a browniſh colour, and a ſoft vapid kind of taſte: extracts made from them, both by water and by rectified ſpirit, are weakly ſweetiſh, bitteriſh, ſubaſtringent, and ſubſaline. Theſe roots are recommended as mild diuretics, diaphoretics, and ſweeteners, in ſcorbutic, rheumatic, gouty, and venereal diſorders; and are ſuppoſed to be of ſimilar or ſuperior virtue to china-root and ſarſaparilla, to which, in their ſenſible qualities, they have a conſiderable reſemblance. They are uſed chiefly, and to the beſt advantage, in the form of a decoction: two ounces of the dried root are boiled in three pints of water, till one pint is waſted, and a pint or more of the ſtrained liquor taken warm every day.

The expreſſed juice of the leaves has been ſometimes given to the quantity of a quarter of a pint or more, in the ſame intentions. The leaves are bitterer and more ſaline than the roots, and have nothing of their ſweetiſhneſs: the juice, depurated, and inſpiſſated to the conſiſtence of an extract, diſcovers a moderately ſtrong, penetrating, ſaline bitterneſs.

Theſe ſeeds alſo are bitteriſh and ſlightly aromatic; and have been given, in doſes of a dram, as a diuretic, and as an aperient in diſorders of the breaſt. A good deal of care is requiſite, to clear them thoroughly from the prickly matter with which they are covered, and which, if ſwallowed, immediately diſcovers how much it offends the parts it paſſes through, by the uneaſy ſenſations it produces in the throat.

BARDESANITES, in eccleſiaſtical hiſtory, a ſect of heretics in the ſecond century, the followers of Bardeſanes, a native of Edeſſa, in Meſopotamia.

They held the devil to be a ſelf-exiſtent independant Being; and taught that Chriſt was not born of a woman, but brought his body with him from heaven; maintained that God himſelf was ſubject to fate; and that virtue and vice depended on the influence of the ſtars.

BARGAIN, in commerce, a contract or agreement in buying and ſelling.

BARGAIN *and Sale*, in law, is properly a contract, made of manors, lands, and other things, transferring the property thereof from the bargainer to the bargainee, for a conſideration in money.

This method of conveying lands was created and eſtabliſhed by the 27th of Henry VIII. cap. 10. which executes all uſes raiſed; and as this introduced a more ſecret way of conveying than was known to the policy of the common law, the enrollment of the bargain and ſale was made neceſſary by the ſixteenth chapter of the ſtatute. *Cunningham's Law Dict.*

BARGE, a veſſel or boat of ſtate, curiouſly decorated, furniſhed with elegant apartments, canopies and cuſhions, equipped with a band of rowers, and adorned with flags and ſtreamers: they are generally uſed for proceſſions on the water, by noblemen, officers of ſtate, or magiſtrates of great cities: of this ſort we may reaſonably ſuppoſe the famous galley of Cleopatra. There are likewiſe others of a ſmaller kind for admirals and captains of the royal navy, calculated to be eaſily hoiſted into and out of the ſhips to which they belong. Barges are alſo flat-bottomed veſſels of burthen for lading and diſcharging ſhips, and removing their cargoes in a harbour. See LIGHTER, PRAM, KEEL.

BARGE-COUPLES, in architecture, a beam mortiſed into another, to ſtrengthen the building.

BARGE-COURSE, with bricklayers, implies that part of the tiling which projects over without the principal rafters, in all ſorts of buildings where there is either a gable-end, or a kirkin-head.

BARILLA, a ſpecies of pot-aſh, ſometimes called ſoda, and prepared in Spain from a plant called kali. See KALI.

BARING *of Trees*, in agriculture, implies the taking away part of the earth about the roots, that the rain and ſnow water, during the winter, may penetrate further into them. This operation is generally performed in the autumn.

BARK, *Cortex*, the exterior part of trees, correſponding with the ſkin of an animal. The bark of the oak has been long uſed in tanning leather, and even thought eſſential to that operation; but a different ſubſtance has been lately diſcovered, which anſwers the purpoſe full as well, and may be procured at a much cheaper rate; we mean oak ſaw-duſt, or the chips of oak reduced to powder. This valuable ſecret was lately purchaſed by the ſociety for the encouragement of arts, &c. See the article TANNING.

Jeſuits BARK. See the article QUINQUINA.

BARK, in naval affairs, a general name given to ſmall ſhips: alſo a ſhip of three maſts, without any mizen-top maſt: likewiſe a name to diſtinguiſh a veſſel with a broad ſtern, without any figure on the prow or ſtem. See HEAD, TOP-MAST, STERN.

BARKING *of Trees*, the peeling off the rind or bark.

It is neceſſary, in our climate, to perform this operation in the month of May; becauſe, at that ſeaſon only, the bark is, by the great quantity of ſap, ſeparated from the wood.

BARLEY, *Hordeum*, a gramineous, frumentaceous plant, whoſe ſeeds are of the larger ſort, covered with a huſk growing in a ſpike, and the grains bearded.

Cultivation of BARLEY. Some ſow barley upon land where wheat grew the former year; but, when this is practiſed, the ground ſhould be ploughed the beginning of October, in a dry time, laying it in ſmall ridges, that the froſt may mellow it the better; and this will improve the land greatly: then, in March, the ground is ploughed again, and laid even, where it is not very wet; but in ſtrong wet lands the ground ſhould be laid round, and the furrows made deep to receive the wet. When this is finiſhed, the ſeed ſhould be ſown with a broad caſt, at two ſowings; the firſt being harrowed in once, the ſecond ſhould be harrowed until the ſeed is buried. The common allowance of ſeed is four buſhels to an acre.

It is a very common fault with farmers to ſow too much grain of all ſorts on their land; not conſidering that, if the roots of corn ſtand very cloſe together, there will not be room for them to put out many ſtems; ſo that frequently there is not more than two or three ſtalks to a root; whereas, if the roots were farther diſtant, there might be ten or twelve, and on good land many more. We have counted upwards of ſeventy ſtalks of barley from one root, which was tranſplanted in a garden, where the ground was light, but not rich: and are ſatisfied, by ſeveral experiments, that, where barley is ſown early upon light ground, it ſhould not be too thick; for, if it is rolled two or three times before it ſtalks, the roots, by being preſſed, will ſhoot out a great number of ſtalks; and it will not be ſo liable to lodge with wet, as the barley which is ſown thick; ſo muſt conſequently be drawn up much taller, and have weaker ſtalks.

When the barley is ſown, the ground ſhould be rolled after the firſt ſhower of rain, to break the clods, and lay the earth ſmooth, which will render it better to mow, and alſo cauſe the earth to lie cloſer to the roots of the corn, which will be of great ſervice to it in dry weather.

Where barley is ſown upon new broken up-land, the uſual method is, to plough up the land in March, and let it lie fallow until June; at which time it is ploughed again, and ſown with turnips, which are eaten by ſheep in winter; by whoſe dung the land is greatly improved; and then in March following the ground is ploughed again, and ſown with barley as before.

There are many people who ſow clover with their barley; and ſome have ſown the lucern with barley; but neither of theſe methods is to be commended; for, where there is a good crop of barley, the clover or lucern muſt be ſo weak as not to pay for ſtanding: ſo that the better way is to ſow the barley alone, without any other crop among it; and then the land will be at liberty for any other crop, when the barley is taken off the ground: but this practice of ſowing clover, rye-graſs, and other graſs ſeeds, with corn, has been ſo long and univerſally eſtabliſhed among farmers, that there is little hope of prevailing with thoſe people to alter a cuſtom which had been handed down to them from their predeceſſors, altho' there ſhould be many examples produced to ſhew the abſurdity of this practice.

The time for cutting of barley is when the red colour of the ears is off, and the ſtraw turns yellow, and the ears begin to hang down. In the north of England they always reap their barley, and make it up in ſheaves, as is practiſed here for wheat; by which method, they do not loſe near ſo much corn; and it is alſo more handy to ſtack: but this method cannot ſo well be practiſed where there are many weeds amongſt the corn, which is too frequently the caſe in the rich lands near London, eſpecially in moiſt ſeaſons; therefore, when this is the caſe, the barley muſt lie on the ſwarth till all the weeds are dead: but, as it is apt to ſprout in wet weather, it muſt be ſhook up, and turned every fair day, after rain, to prevent it. When it is carried, it ſhould be thoroughly dry; otherwiſe, if it be ſtacked wet, it will turn muſty; or, if too green, it is ſubject to burn in the mow. The common produce of barley is two and an half, or three quarters, on an acre; but ſometimes there have been known four quarters on an acre.

Barley-Corn, the leaſt long-meaſure known in England; it is equal to one third of an inch.

BARNABITES, in eccleſiaſtical hiſtory, a religious order founded in the ſixteenth century by three Italian gentlemen, who had been adviſed by a famous preacher of thoſe days, to read carefully the Epiſtles of St. Paul; and hence they were ſtiled clerks of St. Paul: but acquired the name of Barnabites, from their performing their firſt exerciſe in the church of St. Barnabas at Milan. Their habit is black, and their duty conſiſts in inſtructing, catechiſing, and ſerving in miſſion.

BARNICLE, or ſoland gooſe, in natural hiſtory, a ſpecies of gooſe with a black beak, which is much ſhorter than that of the common gooſe. It is common in the north of Scotland.

Barnicle alſo ſignifies a ſpecies of ſhell-fiſh, often found ſticking to the bottoms of ſhips, rocks, &c.

Barnicles, among farriers, an inſtrument compoſed of two branches, joined at one of the extremities with a hinge. It is put upon the noſe of a horſe, when he will not otherwiſe ſtand quiet to be ſhod, blooded, or dreſſed.

BAROCO, in logic, implies the fourth mode of the ſecond figure of ſyllogiſms.

A ſyllogiſm in baroco has the firſt propoſition univerſal and affirmative; but the ſecond and third, particular and negative; while the middle term is the predicate in the two firſt propoſitions. The following is of this kind:

B A. Every virtue is attended with diſcretion:
R O. Some kinds of zeal are not attended with diſcretion;
C O. Therefore ſome kinds of zeal are not virtues.

BAROMETER, an inſtrument for meaſuring the weight of the atmoſphere, and the variations that happen therein, in order to indicate the changes of the weather. The word is compounded of βαρος, weight, and μετρεω, to meaſure.

As the air is a heterogeneous fluid, it will vary in its weight as its component parts are different; and alſo according to its different altitudes. Few bodies are lighter than water, which is alſo very eaſily rarified into vapour. Hence it follows, that when the air is filled with aqueous particles it will be lighteſt, as we generally find it is in moiſt rainy weather; and alſo that it will be oftener in this than in a heavier ſtate. Some inſtrument therefore is neceſſary to indicate theſe changes, and ſhew the weight of the air at all ſeaſons; and may be made in the following manner:

A glaſs tube, hermetically ſealed at one end, is to be filled with quickſilver, well defecated and purged of its air. The finger being then placed on the open end, in immediate contact with the mercury, ſo as not to admit the leaſt particle of air, the tube is inverted and carefully immerſed, with the finger on the open end, into a baſon of the ſame prepared mercury; then, upon removing the finger, the mercury in the baſon will join that in the tube; and the column of mercury in the latter will immediately ſubſide to a certain pitch, or altitude, provided the tube be above thirty-one inches long.

Let A B (plate XXIII. *fig.* 1.) be ſuch a tube, thirty-four inches in length, and a quarter of an inch in diameter, hermetically ſealed at A, and open at B; let C D be the baſon of mercury, into which the tube is immerſed in an inverted poſition; E F, the ſurface of the mercury in the baſon, and G H, that in the tube. Now it is very eaſy to conceive that if this whole apparatus were in vacuo, all the mercury in the tube would, as ſoon as inverted and the finger taken away, deſcend into the baſon; becauſe it muſt, as being a heavy body, deſcend towards the center of the earth, till it meets with ſuch an obſtacle as the baſon to obſtruct its motion, and ſupport it.

But ſince the mercury does not totally ſubſide when this is done in the open air, it follows that the column remaining in the tube muſt be ſuſpended by the gravity of the air preſſing on the ſurface of the mercury in the baſon. And ſince the mercury in the baſon is in equilibrio with that in the tube, it is plain, that the weight of the mercury in the tube, and the weight of the air upon every circular area of the ſurface of the mercury in the baſon, equal to the orifice of the tube, muſt be equal: conſequently the weight of the column of mercury, in the tube, is equal to the weight of a column of air of the ſame baſe, and whoſe altitude is equal to that of the atmoſphere; conſequently this column of mercury will always ſhew the gravity of the air by its riſe and fall in the tube, and indicate the various changes that happen in the atmoſphere. This diſcovery was made by Torricelli, an Italian gentleman, and a diſciple of the famous Galileo. It is therefore often called the Torricellian tube, the Torricellian experiment, &c.

Since this ſuſpended column of mercury exactly indicates the gravity of the air at all times, philoſophers have watched its various ſtations with the greateſt attention, in order to diſcover the two extremes of the air's gravity, by obſerving the leaſt and greateſt altitude of this mercurial column, which long experience has at laſt ſhewn to be nearly 28 and 31 inches; the mercury very rarely falling below the former, or riſing above the latter: whence 29 inches and a half is fixed upon as the mean altitude, expreſſing the mean gravity of the air, and may therefore be repreſented by B I; let the greateſt altitude be B I, and the leaſt B K; then will H I, the diſtance between them be what is called the ſcale of variation.

This ſcale or diſtance being three inches in the perpendicular tube; and it being known that fluids will always have the ſame altitude in a tube of any form or inclination; various artiſts have contrived various methods to increaſe the motion of the mercury, by making it move over a larger ſpace: and thus have invented ſeveral different ſorts of barometers, the principal of which we ſhall here deſcribe.

That which is next the upright one, is moſt eſteemed, is called the diagonal barometer, and is repreſented in *fig.* 2. where A B C is a tube hermetically ſealed at C, and immerſed in a baſon of mercury at A. This tube is perpendicular

pendicular from A to B, where the ſcale of variation begins; but is there bent into the form BC, mrking an acute angle F BC. This part B C extends to the higheſt limit in the ſcale of variation, viz. I C; and conſequently while the mercury riſes from K to I, in the common barometer, it will move in this from B to C, enlarging the ſcale of variation in the proportion of B C to F B; that is, of the diagonal to the leaſt ſide of a parallelogram.

But this barometer is attended with one great inconvenience, which leſſens its utility. Quickſilver being a very heavy body, and ſupported on the part B C, forming an inclined plane, it muſt have a very conſiderable degree of friction, which will be increaſed in proportion as the part B C is more oblique; and conſequently the very ſmall and nice variation of the air's preſſure cannot be ſo accurately indicated in this, as in the common form. It alſo very often happens, from the inclination of the part B C, that the quickſilver divides into ſeveral parts, and thence frequently requires the trouble of re-filling the tube. This barometer was invented by Sir Samuel Moreland.

M. Caſſini invented another kind of barometer, in order to enlarge the ſcale of variation; an invention which was afterwards compleated by M John Bernoulli. It conſiſts of a tube A C D F, (*fig.* 3.) hermetically ſealed at A, and bent to a right angle at D; whence it has acquired the name of the horizontal rectangular barometer. The mercury ſtands in both the legs from E to B; the ſcale of variation from A to C is made in a larger part; and it is evident, that in moving three inches from A to C, it will move through ſo many times three inches in the ſmall leg D F, as the bore of D F is leſs than the bore of A C; whence the motion of the mercury at E muſt be extremely ſenſible. But the inconvenience here too is, that the mercury is very apt to break off in the leg E, and alſo to run out at the end F. Here is alſo a great degree of friction, and at the ſame time the attraction of coheſion will, from the ſmallneſs of the bore D F, impede the free motion of the mercury.

The pendant barometer is made in another form, conſiſting of a ſingle tube ſuſpended by a ſtring faſtened to the end A. (*fig.* 4.) This tube is of a conical or tapering form, the end A being a little leſs than that at B. It is hermetically ſealed at A, and filled with mercury: then will the mercury ſink to its common ſtation, and admit a length of altitude C D, the ſame with that in the common barometers. But from the conical bore of the tube, the mercury will deſcend as the air grows lighter, till it reaches its loweſt altitude, when the mercury will ſtand from the lower part of the tube B to E; ſo that B E will equal 28 inches: conſequently the mercury will, in ſuch a tube, move from A to E, or 32 inches, if the tube be five feet, or 60 inches long; and therefore the ſcale A E is here above ten times greater than in the common barometer: but the fault of this barometer is, that the tube being of a very ſmall bore, the attraction of coheſion will be very conſiderable, and prove an impediment to that freedom of motion, neceſſary to ſhew a very ſmall variation in the air's weight. This invention we owe to M. Amonton, who publiſhed it in the year 1695.

The wheel barometer, ſo called from its ſtructure, is eaſily underſtood from the figure, where A C D G (plate XV. *fig.* 11.) repreſents the quickſilver in a glaſs tube, having a large round head, or baſs at top, and turned up at the bottom F. Upon the ſurface of the mercury in the bent leg, there is placed an iron ball G with a ſtring going over a pulley C D, and balanced by another weight H, ſuſpended freely in the air. As the ſurface of the mercury at A is very large, and that at G very ſmall, the motion of the quickſilver, and conſequently of the ball G, will at the bottom be very conſiderable; but as the weight G moves up and down, it turns the pulley C D, and that a hand or index K L, pointing to the diviſions of a large graduated circle M N O P; by which means the minuteſt variations of the air are plainly indicated, provided the inſtrument be ſo accurately made that the friction of the ſeveral parts be inconſiderable. This is one of the many curious inventions of Dr. Hooke.

Mr. Rowning invented a kind of compound barometer, conſiſting of mercury and water. A B C (pl. XXIII. *fig.* 5.) is a compound tube hermetically ſealed at A, and open at C, empty from A to D, filled with mercury from thence to B, and from thence to E with water. Let G B H be a horizontal line, then it is plain from the nature of the ſyphon, that all the compound fluid contained in the part from H to G, will be always in equilibrio with itſelf, be the weight of the air what it will, becauſe the preſſure at H and G muſt be equal. Whence it is evident that the column of mercury D H, is in equilibrio with the column of water G E, and a column of air of the ſame baſe conjointly, and will therefore vary with the ſum of the variations of each of theſe. The great property of this barometer is, that the ſcale of variation may be increaſed *ad infinitum.* But notwithſtanding this property, it will afford the theoriſt more pleaſure than the practical artiſt.

We have already hinted that the common barometer is the beſt inſtrument yet known for meaſuring the gravity of the air: but, in order to its doing this to the greateſt perfection, the following particulars are neceſſary to be obſerved. 1. The tube muſt be at leaſt one quarter of an inch in diameter; one third of an inch is a very proper ſize. 2. The tube ought to be new, clean, and dry within when filled; and in order to this it ſhould be hermetically ſealed at both ends, when made at the glaſs-houſe, one end of which may be cut off with a file, when you intend to uſe it. 3. The diameter of the ciſtern that holds the mercury, in which the open end of the tube is immerſed, ſhould be as large as conveniently may be, that the mercury therein may have nearly at all times the ſame degree of altitude, otherwiſe the index will not be true. 4. The mercury muſt be very pure, and free from any mixture of tin, lead, or other metal. 5. It ought to be purged entirely from air, as it may be by boiling, and filling the tube with it, while nearly boiling hot. 6. The tube muſt be heated before it is filled, to prevent its breaking with the boiling mercury. 7. It ſhould be rubbed very hard, to excite the electric virtue, which will expel the particles of the air from the internal ſurface. 8. There ought to be a nonius, or vernier, applied to the index of the graduated plate, for meaſuring more accurately the riſe and fall of the mercury.

As the principal uſe of the barometer is to eſtimate the gravity of the air at different times, in order to foreſee the alterations of the weather, it will be proper here to add the following particulars relating to the riſe and fall of the mercury, as they are the reſult of careful and repeated obſervations.

1. The riſing of the mercury preſages in general fair weather, and its falling the contrary. 2. In very hot weather, the falling of the mercury indicates thunder. 3. In winter the riſing preſages froſt; but in a continual froſt, it indicates ſnow. 4. When foul weather happens immediately after the falling of the mercury, little of it is to be expected; and ſo on the contrary of fair weather. 5. But when the mercury continues to riſe for ſome time before the foul weather is over, a continuance of fair may be expected to follow. 6. In fair weather, when the mercury continues to fall before the rains come on, it preſages a great deal of wet, and probably high winds. 7. The unſettled motion of the mercury denotes uncertain and changeable weather.

From theſe obſervations, it appears, that it is not ſo much the heighth of the mercury in the tube that indicates the weather, as the motion of it up and down; in order therefore to know whether the mercury be actually riſing or falling, the following obſervations may be of uſe. 1. If the ſurface of the mercury be convex, it is a ſign that the mercury is then riſing. 2. If the ſurface be concave, that it is ſinking. 3. If the ſurface be plain, or rather a little convex, the mercury is ſtationary. 4. If the tube be ſmall, ſhake the tube, and if the air be growing heavier, the mercury will riſe about half the tenth of an inch; if it be growing lighter, it will ſink as much.

We ſhall end this article with a ſolution to the following curious and uſeful problem, viz.

Having given the height of the mercury in the barometer at the earth's ſurface, to find the height thereof at any given diſtance from the center of the earth, the law of gravitation being reciprocally as the ſquare of that diſtance.

Let the circle S F H (plate XXIII. *fig.* 6.) repreſent the earth, C the center, S a point upon its ſurface, and C B the given diſtance from the center C, where the height of the mercury is required. Let D E *e* be a curve, whoſe nature is ſuch, that the ordinates A D, B E, &c. are reſpectively as the denſities of the atmoſphere in the points A, B, &c. put $CS = r$ the radius of the earth, $CB = x$, $BE = y$, $Bb = \dot{x}$, unity for the force of gravity, and D for the denſity of the atmoſphere at the earth's ſurface: Then $\frac{r^2}{x^2}$ will repreſent the force of gravity at the point B, and $-y\dot{x}$ the fluxion of the denſity at that point; hence $\frac{-r^2 y\dot{x}}{xx}$ is the fluxion of the preſſure of the atmoſphere at the point B; but the denſity being as the compreſſed force, it follows that $\frac{-r^2 y\dot{x}}{x^2}$ is as $\dot{y}$, or $\frac{-r^2 y\dot{x}}{x^2} = b\dot{y}$, and $\frac{-r^2\dot{x}}{x^2} = \frac{b\dot{y}}{y}$, by taking the fluent of each ſide the equation, we get $\frac{rx+rr}{x} = b \times$ hyp. log. y. But when B coincides with S, then $x = r$, and the expreſſion becomes $2r = b \times \log. D$; from this equation ſubtract the former, viz. $\frac{rx+rr}{x} = b \times \log. y$, and we ſhall have $2r - \frac{rx+rr}{x} = b \times \log. D - b \times \log. y$, or $\frac{rx-rr}{x} = b \times \log. \frac{D}{y}$.

It is found by experiment that the mean denſity of air is to the denſity of water, as 1 to 820; and to that of mercury, as 1 to 13½: whence it follows, that the mean denſity of air is to the denſity of mercury, as 1 to 13½ × 820, or 1 to 11070; conſequently cylinders of air and mercury, of equal baſes, having their altitudes in the ratio of 11070 to 1, are of equal weights, it being well known that the quantity of matter is directly as the denſity and bulk conjunctly.

Let the mean altitude of the mercury in the barometer be taken equal to 30 inches, then will the height of a column of air of equal weight and baſe with the mercury in the barometer be expounded by 11070 × 30, equal to 332100 inches, or 27675 feet. Suppoſe it were now required to find the altitude of the mercury in the barometer, at a height of 1240 yards above the ſurface of the earth, or, which is the ſame thing, 209958164 feet from the center, here, by taking $r = 20995444$ feet, $b = 27675$, $D = 30$, and $x = 209958164$, we ſhall have $\frac{rx - r^2}{x} = 27675 \times \log. \frac{D}{y}$; or, if r be expounded by 1, $\frac{x-1}{x} = ,00131 \times \log. \frac{D}{y}$, that is, $\frac{x-1}{,00131x}$, or $135398 = \log. \frac{D}{y}$, the natural number of which 135398 is the hyperbolic logarithm is 1,145, therefore $\frac{D}{y}$ or $\frac{30}{y} = 1,145$; from hence we get $y = \frac{30}{1,145} = 26,2$, the height of the mercury in the barometer at 1240 yards above the earth's *ſurface*; which agrees exactly with Dr. Halley's experiment made with a barometer upon the top of Snowdon-Hill, 1240 yards high, where he found the mercury to be lower by three inches eight tenths, than at the foot thereof.

BARON, the next degree of nobility below a viſcount and above a baronet.

Barons *of the Exchequer*, the four judges to whom the adminiſtration of juſtice is committed, in matters relating to the revenues of the crown.

They were formerly barons of the realm; but are generally of late perſons learned in the law. They are obliged by their office to inſpect the king's accounts, and accordingly have auditors under them.

Barons *of the Cinque Ports*, are the members of the houſe of commons ſent by the Cinque ports. See Cinque Ports.

Baron and Feme, a term uſed in our law to ſignify the huſband in relation to his wife, who is called feme. They are conſidered only as one perſon, ſo that a huſband cannot be witneſs for or againſt his wife, nor the wife for or againſt her huſband, except in caſes of high treaſon.

Baron and Feme, in heraldry, is when the coats of arms of a perſon and his wife are borne per pale in the ſame eſcutcheon, the man's being always on the dexter, and the woman's on the ſiniſter ſide: but if the woman be an heireſs, her coat muſt be borne by the huſband on an eſcutcheon of pretence.

BARONET, a modern degree of honour, next to a baron, created by king James I. in order to ſettle a plantation in Ulſter, for which purpoſe each was to maintain thirty ſoldiers in Ireland for three years, after the rate of eight-pence ſterling per day to each ſoldier.

This honour is hereditary, and they have the precedence of all knights, except thoſe of the garter, bannerets, and privy counſellors.

BARONY, the honour and territory which gives title to a baron, whether he be a layman or a biſhop.

BAROSCOPE, the ſame with barometer. See Barometer.

The word is formed from βαρος, weight, and σκοπεω, to view.

BARR. See Bar.

BARRACAN, in commerce, a ſort of ſtuff reſembling camblet, but of a coarſer grain.

BARRACKS, or **Baracks**, places erected for ſoldiers to lodge in, eſpecially in garriſons.

BARRATOR, in law, a common mover or maintainer of ſuits and quarrels, either in courts, or elſewhere.

Lambert derives the word from the Latin, *barathro*, or *balatro*, a vile knave.

BARRATRY, in the marine acceptation, implies a defrauding the owners by the maſter of the ſhip.

BARREL, in commerce, a round veſſel, in the form of a ſmall tun, for holding ſeveral ſorts of merchandize.

Barrel alſo implies a liquid meaſure, and is of three kinds, wine, beer, and ale. The firſt contains thirty-one gallons and a half; the ſecond thirty-ſix gallons; and the third thirty-two gallons.

Barrel likewiſe denotes a certain weight of ſeveral merchandizes, which not only differs in different commodities, but alſo in different places. A barrel of Eſſex butter weighs one hundred and ſix pounds; and a barrel of Suffolk butter two hundred and fifty-ſix pounds. The barrel of herrings ought to contain thirty-two gallons wine meaſure, and will hold about a thouſand herrings. The barrel of ſalmon muſt contain thirty-two gallons. The barrel of eels the ſame. The barrel of ſoap muſt weigh two hundred and fifty-ſix pounds.

Barrel, in mechanics, a name given by watchmakers to the cylinder about which the ſpring is wrapped; and by gun-ſmiths to the cylindrical tube of a gun, piſtol, &c. through which the ball is diſcharged.

Barrel, in anatomy, a pretty large cavity behind the tympanum of the ear, about four or five lines deep, and five or ſix wide. It is lined with a fine membrane, on which are ſeveral veins and arteries. See Ear.

Thundering **Barrels**, in military affairs, are a ſort of caſks, filled with bombs, grenades, and other deſtructive inventions, to be rolled down a breach.

BARRICADE, or **Barricado**, a military term for a fence formed in haſte with veſſels, baſkets of earth, trees, palliſades, or the like, to preſerve an army from the ſhot or aſſault of the enemy.

The moſt uſual materials for barricades conſiſt of pales or ſtakes, croſſed with battoons, and ſhod with iron at the feet; uſually ſet up in paſſages or breaches.

Barricade, in naval architecture, a ſtrong wooden rail, ſupported by ſtanchions, extending acroſs the foremoſt part of the quarter-deck. In a veſſel of war, the vacant ſpaces between the ſtanchions are commonly filled with rope-matts, cork, or pieces of old cable; and the upper-part, which contains a double-rope-netting above the rail, is ſtuffed with full hammocks to intercept the motion, and prevent the execution of ſmall ſhot in time of battle. See Deck, Hammock.

BARRIER, in fortification, a kind of fence made acroſs a paſſage or the entrance of a retrenchment, &c.

It is compoſed of large ſtakes about four or five feet high, placed eight or ten feet diſtant from one another, with tranſums, or over-thwart rafters, to ſtop either horſe or foot. In the middle is a moveable bar of wood, that opens or ſhuts at pleaſure.

BARRING *a Vein*, in farriery, implies an operation performed on the veins of a horſe's legs, and other parts of his body, in order to ſtop the courſe of the blood, and leſſen the quantity of malignant humours flowing to that part. This operation, as it is founded on a falſe theory, ſo it is now never uſed by ſkilful farriers.

BARRISTER, in common law, implies a perſon qualified and impowered to defend the cauſe of clients in any of the courts of juſtice.

The word is formed from the Latin, *bar*, *barra*, the place where they ſtand to plead.

Barriſters are of two ſorts, diſtinguiſhed by the epithets outer, and inner. The outer-barriſters are thoſe who plead without the bar. The inner-barriſters are thoſe who are allowed the privilege of pleading within the bar. But at the Rolls, and ſome other inferior courts, all barriſters are admitted within the bar.

BARROW, in ſome ſalt works, is a name given to wicker caſes in the form of a ſugar loaf, wherein the ſalt is put to drain.

BARRULET, in heraldry, ſignifies the fourth part of the bar, or one half of the cloſet.

BARRULY, in heraldry, is when the field is divided bar ways, that is, acroſs from ſide to ſide, into ſeveral parts. See plate XXIII. *fig*. 7.

BARRY, in heraldry, is when an eſcutcheon is divided bar-ways, that is, acroſs from ſide to ſide, into an even number of partitions, conſiſting of two or more tinctures, interchangeably diſpoſed. It is to be expreſſed in the blazon by the word *barry*; and the number of pieces muſt be ſpecified; but if the diviſions be odd, the field muſt be firſt named, and the number of bars expreſſed.

Barry-Bendy is when the eſcutcheon is divided evenly, bar and bend-ways, by lines drawn tranſverſe and diagonal, interchangeably varying the tinctures of which it conſiſts. See plate XXIII. *fig*. 8.

Barry-Pily is when a coat is divided by ſeveral lines drawn obliquely from ſide to ſide, where they form acute angles.

BARSANIANS, in eccleſiaſtical hiſtory, a ſect of heretics in the ſixth century, who followed the errors of the Cainites and Theodoſians; and were ſo called from one Barſinius their leader.

They made their ſacrifices conſiſt in taking wheat flour on the top of their fingers, and carrying it to their mouths. They never eat meat with other men; and maintained the Holy Ghoſt to be a creature.

BARTERING, in commerce, the exchanging one commodity for another, or ſending a merchant a parcel of goods, and taking others of him in exchange.

The word is formed from the Spaniſh, *baratar*, to deceive, or circumvent; becauſe, perhaps, thoſe who deal this way, endeavour to over-reach one another.

BARTHOLOMITES, a religious order founded at Genoa, in the year 1307; but the monks leading very irregular lives, the order was ſuppreſſed by pope Innocent X. in 1650, and their effects confiſcated.

BARUCH, the name of an apocryphal book, ſubjoined to the canon of the Old Teſtament.

It has been reckoned part of Jeremiah's prophecy, and is often cited by the ancient fathers as ſuch. Joſephus tells us, that Baruch was deſcended from a noble family. It is added, that he wrote the book himſelf, while he continued at Babylon; but at what time is uncertain.

There are three copies of this book, one in Greek, the other two in Syriac: one of the latter agrees with the Greek, but the other varies from it. In what language it was written, whether one of theſe copies be not the original, or which of them may be ſo, is difficult to determine.

BARUTH, an Indian meaſure containing ſeventeen gantans, and ought to weigh three pounds and an half Engliſh averdupoiſe.

BARULES, in eccleſiaſtical hiſtory, a ſect of heretics, who held that the Son of God had only the phantom of a body; that ſouls were created before the world, and that they lived all at one time.

BAS-RELIEVE. See Basso-Relievo.

BASALTES, in natural hiſtory, a ſpecies of marble of a very fine texture, and of a deep gloſſy black colour.

The moſt remarkable quality of this marble is its figure, being never found in ſtrata, like other marbles, but always ſtanding up in form of regular angular columns, compoſed of a number of joints placed on and nicely fitted to each other, as if formed by the hand of a ſkilful workman. It is remarkably hard and heavy, will not ſtrike fire with ſteel, and makes a fine touchſtone.

The giants cauſeway in Ireland is entirely compoſed of the baſaltes; and is, perhaps, the moſt ſurprizing natural production of this kind in the world.

BASE, in geometry, the loweſt ſide of the perimeter of a figure: thus any ſide of a triangle may be called its baſe; but the loweſt, or that parallel to the horizon, is moſt properly the baſe. In the triangle KLM (plate IX. *fig*. 3.) the line KL is properly the baſe.

Base, in architecture, is uſed to imply any particular body that bears upon another; but particularly for the lower part of a column and pedeſtal.

Base *of a Column* is that part between the ſhaft and the pedeſtal, if there be any pedeſtal; or, if there be none, between the plinth and the zocle. The ornaments of the baſe, which are ſuppoſed to have repreſented originally the iron circles with which the trees and poſts that ſupported the ancient houſes were bound, are different in the different orders.

The Tuſcan Base is the moſt ſimple of all others, conſiſting only of a ſingle tore, beſides the plinth. See plate XI.

The Doric Base has an aſtragal more than the Tuſcan, tho' that was indeed introduced by the moderns.

The Ionic Base has a large tore over two ſlender ſcotias, ſeparated, according to Vitruvius, by two aſtragals.

The Corinthian Base has two tores, two ſcotias, and two aſtragals.

The Compoſite Base has an aſtragal leſs than the Corinthian.

The Attic Base has two tores and a ſcotia; and is a proper baſe for either the Ionic or Compoſite columns.

Base *Rudentée*, in architecture, is that which has its tores cut like cables.

Base, in fortification, the exterior ſide of the polygon, or an imaginary line drawn from the flanked angle of a baſtion to the angle oppoſite to it.

Base, in gunnery, the leaſt ſort of ordnance, the diameter of whoſe bore is one inch and a quarter, and its weight 200 pounds; the length of the bore is four feet; its ſhot a pound and a half in weight, and one inch and one eighth in diameter.

Base *Line*, in perſpective, the common ſection of a picture, and the geometrical plane.

Base *of the Heart*, in anatomy, denotes its upper part. See Heart.

Base *Eſtate*, in law, implies the eſtate held by a baſe tenure.

Base *Tenure*, the holding by villenage, or other cuſtomary ſervices.

Base *Fee* is to hold in fee at the will of the lord.

Base *Court*, any court not of record.

BASEMENT, in architecture, implies a baſe continued a conſiderable length, as round a houſe, room, &c.

BASHAW, a Turkiſh governor of a province, city, or other diſtrict.

BASIL, in botany, the Engliſh name for a genus of plants called ocymum. See Ocymum.

Basil, among joiners, the ſloping edge of a chiſſel, or of the iron of a plane. They uſually make the baſil twelve degrees for ſoft wood, and eighteen for hard; it having been found by experience, that the more acute the baſil is, the better it cuts; and the more obtuſe it is, the ſtronger and fitter for ſervice.

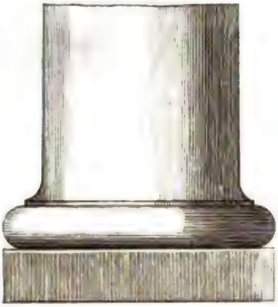
Order of St. Basil, the moſt ancient of all the religious orders, and was very famous in the Eaſt during the latter part of the fourth century; tho' ſome doubt whether St. Baſil was really the founder.

Some authors, among whom is Barbaroſa, ſay, that St.

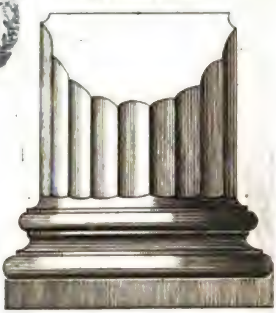
PLATE XI

Facing Base

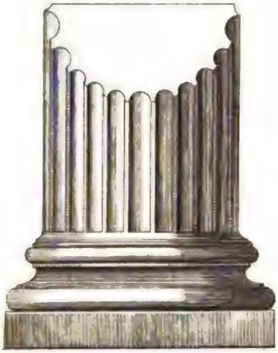
Tuscan Base.



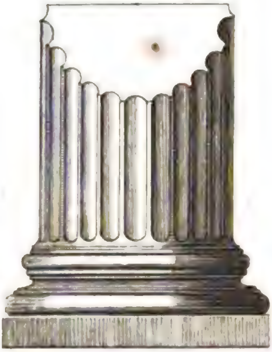
Doric Base.



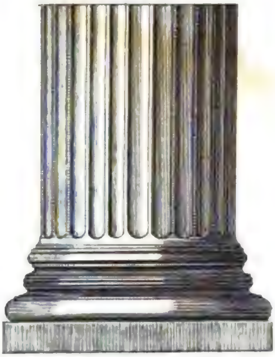
Ionic Base.



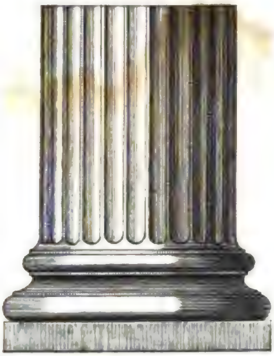
Corinthian Base.



Composite Base.



Attic Base.



10
20
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60
Modds

St. Baſil, before he died, ſaw himſelf the ſpiritual father of more than 90,000 monks in the Eaſt only. But this order, which flouriſhed in ſo remarkable a manner for more than three centuries, was afterwards conſiderably diminiſhed by hereſy, ſchiſm, and a change of the empire. The greateſt ſtorm it felt was during the reign of Conſtantine Copronynimus, in the year 741, who perſecuted the monks of St. Baſil, impriſoning ſome, and baniſhing others; ſo that the greater part of the monaſteries were abandoned, and ſpoiled of all their goods.

BASILARE *Os*, in anatomy, the ſame with os ſphenoides. See SPHENOIDES.

BASILIC, in ancient architecture, implies a latge hall, or public room, with iſles, porticoes, galleries, tribunals, &c. being the term applied to thoſe places where princes ſat and adminiſtered juſtice in perſon.

The word is Greek, *βασιλικη*, and ſignifies a royal houſe, or palace.

The word is now uſed to ſignify ſuch churches, temples, &c. as far ſurpaſs the other ſtructures of the ſame kind in grandeur and magnificence.

BASILICA, in anatomy, the interior branch of the axillary vein, running the whole length of the arm. See VEIN

BASILICON, in pharmacy, an epithet given to ſeveral compoſitions to be found in ancient medicinal writers. At preſent it is confined to two officinal ointments, diſtinguiſhed by the epithets black and yellow; and formerly much uſed by ſurgeons in dreſſing wounds.

BASILICS, in antiquity, a body of the Roman laws, tranſlated into Greek. In this ſyſtem is comprehended the inſtitutes, digeſts, code, novels, and ſome edicts publiſhed by Juſtinian and other emperors.

BASILICUS, in aſtronomy, a ſtar of the firſt magnitude, in the conſtellation Leo, called alſo regulus, and cor leonis, or the lion's heart. See REGULUS.

BASILIDIANS, a ſect of heretics in the ſecond century, and ſo called from their leader Baſilides, a diſciple of Menander. He flouriſhed in Egypt about the year 112, and there chiefly propagated his hereſy.

Baſilides, in the creation of things, admitted a certain ſucceſſive ſcale, in which each link of beings created the ſucceeding, and were themſelves created by the preceding; and conſequently, that one being only owed its exiſtence to God. He alſo taught that there were 365 heavens between the earth and the empyrean; and that each of theſe heavens had a moving and creating angel aſſigned to it; which angel was itſelf created by the next angel above him: and hence came the word Abraxas, or magnificent ſaviour. See ABRAXAS.

With regard to the Chriſtian religion, Baſilides taught, that Chriſt did not really ſuffer upon the croſs; but that Simon the Cyrenean was ſubſtituted in his room: that the promiſcuous copulation of men and women was lawful: that a Chriſtian may renounce the faith to avoid martyrdom; and that the ſoul alone is to be ſaved, and the body never to riſe from its ſtate of corruption.

BASILISK, a fabulous kind of ſerpent, ſaid to be produced from a cock's egg hatched by a ſerpent, and ſuppoſed to kill by its breath or ſight only.

BASILISK, in military affairs, implies a piece of ordnance, carrying a ſhot of forty-eight pounds, and weighing about ſeven thouſand two hundred pounds.

BASIOGLOSSUS, in anatomy, a muſcle ariſing from the baſe of the os hyoides, and running along the middle of the tongue towards its apex. It is aſſiſted by the ceratogloſſus, and draws the tongue backwards.

The word is formed from the Greek, *βασις*, the baſe or foundation, and *γλωσσα*, the tongue.

BASIS, the ſame with baſe. See BASE.

BASKETS *of Earth*, in the military art, ſignify ſmall baſkets filled with earth, and uſed in ſieges on the parapet of a trench. The French call them *corbeilles*. They are generally a foot and a half high, the ſame in diameter at the top, and eight or ten inches at bottom; ſo that when ſet together, a ſort of embraſures are left at their bottoms, through which the ſoldiers fire, without expoſing themſelves.

BASKET-SALT, a very fine ſalt, much purer, whiter, and compoſed of ſmaller grains than the common ſort

BASKET-TENURE, a tenure of lands by the ſervice of making the king's baſkets.

BASON, in anatomy; ſee the article PELVIS.

BASON, in mechanics, a term uſed by glaſs grinders for a diſh of copper, iron, &c. in which they grind convex glaſſes, in the ſame manner as concave ones are ground on ſpheres.

The hatters call the iron mould in which they form the matter of their hats, a baſon; and they give the ſame name to the leaden one for the brims of hats; the latter has an aperture in the middle big enough for the largeſt block to go through.

BASON or FOUNTAIN, among gardeners, implies a reſervoir for holding water either for the ornament or uſe of the garden.

Theſe reſervoirs are made in divers forms, ſome round, ſome oblong or oval, others ſquare, octangular, &c. but their moſt common form is circular; and if the ground will permit, the larger they are the better; and when they exceed in ſize, they are called pieces of water, canals, fiſh-ponds, pools, &c.

In making theſe, care ought to be taken to avoid both extremes, and not to make them too big or too little; that a water-work may not take up the beſt part of a ſmall piece of ground; nor to make too little a baſon in a large ſpot. This muſt depend entirely on the judgment of the deſigner of the garden.

Some would have the ſize of a baſon to be proportioned to the jet d'eau, that the water thrown up in the air may not, by being blown by the air, be carried beyond the edge of the baſon, but fall down without wetting the walk.

As to the depth of baſons, they are uſually from two to three feet; this depth being ſufficient to ſecure the bottom of the baſons from froſt, and to dip watering-pots.

But if they are to ſerve as reſervoirs, or to keep fiſh in; then they may be made four or five feet deep, which will both hold water enough for the fiſh to breed in, and alſo to bear a boat.

Deeper than this they ſhould not be; for if they were deeper, they would be dangerous as to the drowning of perſons who might chance to fall in.

In making baſons, great care ought to be taken of making them at firſt; for the water always naturally endeavouring to run away, and by its weight and preſſure in a baſon, making its way out at the leaſt cranny, it will grow conſtantly bigger and bigger; ſo that, if it be not well made at firſt, it will be very difficult to repair it.

Baſons are made either with clay, cement, or lead; they are moſt uſually made of clay; in making ſuch, at the marking out the dimenſions, the diameter ought to be four feet bigger on each ſide; yet the baſon will not be wider; for it will be taken up with the walls on each ſide: and the clay-work, which is to fill the ſpace between the baſon, muſt alſo be dug two feet deeper than the depth of the water is deſigned to be, becauſe it is to be laid over eighteen inches thick with clay, and ſix inches with gravel and paving.

The clay ought to be well wrought with the hands and water; and when it is ſpread, ſhould be trodden in with the naked feet, that the water of the baſon may not dilute through it, and the roots of any trees that may grow near, may not penetrate into the outward wall, which may be made of ſhards, rubble, or flints, with mortar made of the natural earth, and is called the ground-wall, becauſe it is only made to reſiſt the preſſure of the ground about it. The inward wall ought to be made with good rubble ſtones, that will not ſcale and come off in flaſhes in the water; or elſe of flints and ſtones from the hills, which will make durable works, but will not look ſo neat as the pointed rubble; and there ought to be laid here and there ſtones the thickneſs of the wall, to render it the more ſubſtantial.

The method of making baſons of cement is as follows: after you have marked out the dimenſions of the baſon, as before, if you enlarge it one foot nine inches, it will be ſufficient; and the ſame depth deeper at the bottom will be enough.

This being done, you muſt begin to back up and raiſe againſt the ground: cut perpendicularly a wall of maſonry a foot thick, which muſt go to the bottom, and ſhould be built with ſhards and rubble ſtones laid in a mortar of lime and ſand. When the wall is finiſhed round the circumference, then the bottom is to be wrought a foot thick with the ſame materials; and the ſolid work or lining of cement is to be backed up againſt the walls nine inches thick, including the plaiſtering and inward ſurface.

This ſolid ought to be made of ſmall flints, laid in beds of mortar made of lime and cement.

When this ſolid is eight inches thick, it ought to be plaiſtered over the whole ſurface of the bottom, with cement well ſifted before it be tempered with lime; and with this it ſhould be wrought over ſmooth with the trowel.

The proportion of this cement ſhould be two-thirds of cement or powdered tile, to one-third of lime.

This cement has the property ſo to harden under water, that it will be as hard as ſtone or marble, and the body will be ſo ſolid as never to decay.

After the finiſhing of the baſon, the plaiſtering ſhould be for four or five days ſucceſſively anointed over with oil, or bullocks blood, to prevent it from cracking or flawing: this being done, the water ſhould be let into the baſon as ſoon as may be.

Thoſe baſons which are made of lead, are to be thus wrought: the out-lines ought to be enlarged one foot of a ſide, and digged half a foot deeper than the baſon is to be. The wall muſt be made a foot thick, that it may be able to bear up againſt the earth lying againſt it; but the bottom will not require to be more than half a foot thick.

Theſe walls muſt be built with rubble laid in mortar all of plaiſter, becauſe the lime will corrode the lead; and then the lead muſt be laid on the walls and bottom, and be ſeamed with ſolder.

But baſons of lead are not much in uſe, becauſe of their great charge in making, and the danger of the lead being ſtolen.

Great care ought to be taken to keep the upper edge and ſuperficies of a baſon upon a level, that the water may cover all the wall equally.

As for the waſte pipes of baſons, whether at the bottom or ſuperficies, they ought not to be made too ſmall, leſt they ſhould be choaked, notwithſtanding the cauls that are drawn before them.

When this waſte water is only to be loſt in ſinks and common ſewers, it is carried away in drains, or earthen-pipes; but when it ſerves to play the baſons that lie below it, it muſt paſs through leaden pipes.

Theſe baſons are now pretty generally rejected by perſons of good taſte, as being no ways ornamental: therefore, where there is a neceſſity to make reſervoirs for water for the uſe of gardens, they are commonly dug in the loweſt part of gardens, or where the ſpot is moſt convenient for receiving the water which may run from the adjacent grounds in hard rains. Theſe ponds ſhould have their ſides made very eaſy; for if they are too upright, the earth frequently breaks down, by the water waſhing and making it hollow below: the ſides and bottom of theſe ponds ſhould be laid nine or ten inches thick with well-wrought clay; and, as the clay is finiſhed, it ſhould be well covered, to prevent the ſun and wind from cracking it before the water is let in. The figures of theſe ponds ſhould not be regular; for the ſhape of the hollow, where they are made, ſhould be followed, which will ſave expences, and have a better appearance.

Basons *of a Balance*, the two ſcales or diſhes faſtened, by ſtrings or chains, to the extremities of the beam; one for holding the weights, and the other the commodity to be weighed.

BASS, in muſic, that part of a concert which conſiſts of the graveſt and deepeſt ſounds, and is played on the largeſt pipes or ſtrings of a common inſtrument, as of an organ, lute, &c.

The baſs is the principal part of a muſical compoſition, and the foundation of harmony; for which reaſon it is a maxim among muſicians, that when the baſs is good, the harmony is ſeldom bad; and the contrary.

Counter Bass is a ſecond or double baſe, where there are ſeveral in the ſame concert.

Thorough Bass, or *Baſſo Continuo*, is the harmony made by the baſs viols, theorbos, &c. continuing to play both while the voices ſing, and the other inſtruments perform their parts, and alſo filling up the intervals when any of the other parts ſtop. It is played by figures marked over the notes on the organ, harpſichord, &c. and frequently ſimple and without figures, on the baſs-viol and baſſoon.

M. Broſſard obſerves, that the thorough baſs is a part of the modern muſic; and that it was invented by Ludovico Viadana, an Italian, in the year 1600.

BASSOON, a muſical inſtrument of the wind ſort, blown with a reed. It is furniſhed with eleven holes, and uſed as a baſs in a concert of hautboys, flutes, &c.

BASSO-RELIEVO, or Bass-Relief, a piece of ſculpture, where the figures do not protuberate, or ſtand out far beyond the plane on which they are formed.

BASS-VIOL, a muſical inſtrument reſembling a violin in the ſhape, but much larger. It is ſtruck with a bow, like a violin, has generally the ſame number of ſtrings, and eight ſtops, which are ſubdivided into ſemi-ſtops. Its ſound is grave, and has a very noble effect in a concert.

BASTARD, a natural child, or one born of a woman not married.

By the laws of England, a baſtard is incapable of inheriting lands, as the heir of his father; nor can any one inherit lands as heir to him, except the children of his own body; for by order of law, a baſtard has no relation, and he himſelf is accounted the firſt of his family.

BASTARDY, a defect of birth, objected to one born out of wedlock, and is either general or ſpecial.

General Bastardy is a certificate from the biſhop of the dioceſe to the king's juſtices, after enquiry made whether the party is a baſtard or not, upon ſome queſtion of inheritance.

Special Bastardy is a ſuit commenced in the king's courts againſt a perſon that calls another baſtard.

BASTERNA, a ſort of vehicle reſembling our chariots, much uſed by the ancient Roman ladies.

BASTION, in fortification, a large maſs of earth, uſually faced with ſods, ſometimes with brick, but rarely with ſtone, ſtanding out from a rampart, of which it is a principal part.

A baſtion conſiſts of two faces and two flanks; the faces include the angle of the baſtion, and their union forms the outmoſt, or ſaliant angle, called alſo the angle of the baſtion; and the union of the two faces to the two flanks, makes the ſide angles, called alſo the ſhoulders or epaules; and the union of the two other ends of the flanks to the two curtains, makes the angles of the flanks.

Thus in *fig*. 8. plate XII. the lines H X, R X, O Q, Q I, are the faces of the two baſtions X and Q; H N, I P, the flanks of the ſame baſtions; and N P the curtain. The angles R X H, O Q I, are the ſaliant angles, or angles of the baſtions; the angles N H X, P I Q, are the ſide angles, ſhoulders, or epaules; and the angles H N P, I P N, the angles of the flanks. The lines A X, A Q, are called the capitals of the baſtions X and Q. Z and Y are two powder magazines; T and W caviliers.

The great rule in conſtructing a baſtion is, that every part of it may be ſeen and defended from ſome other part: mere angles therefore are not ſufficient; but flanks and faces are neceſſary.

The faces muſt not be leſs than twenty-four Rhineland perches, nor more than thirty. The flanks of a baſtion, provided they ſtand at the ſame angle under the line of defence, are ſo much the better the longer they are; they muſt therefore ſtand at right angles with the line of defence At the ſame time the diſpoſition of the flanks make the principal part of fortification, as on them the defence chiefly depends; and it is this that has introduced the various kinds of fortifying.

The angle of the baſtion muſt exceed 60 degrees, otherwiſe it will be too ſmall to give room for guns, and will either render the line of defence too long, or the flanks too ſhort. It muſt therefore be either a right angle,

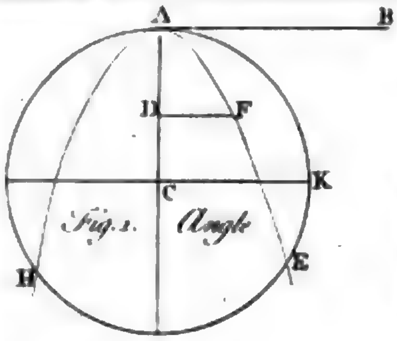
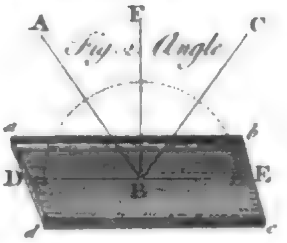


Fig. 1. Angle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E
C
a
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D
B
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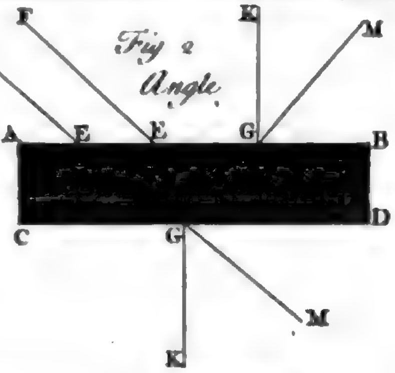
c

Fig. 2. Angle


F
F
K
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M
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Fig 2 Angle

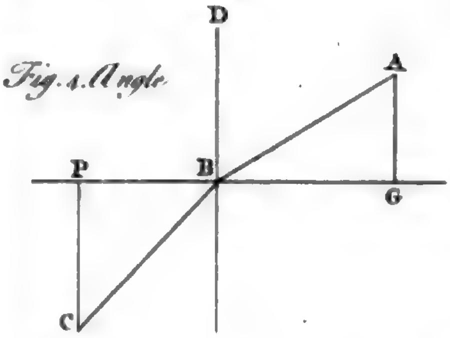

Fig. 4. Angle

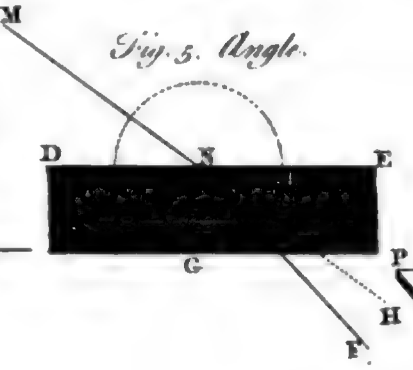

Fig. 5. Angle

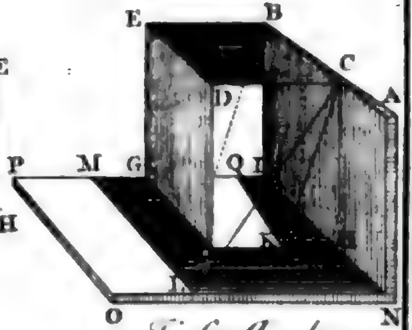
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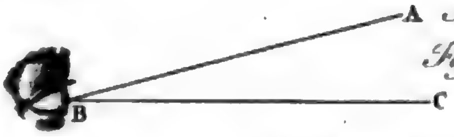
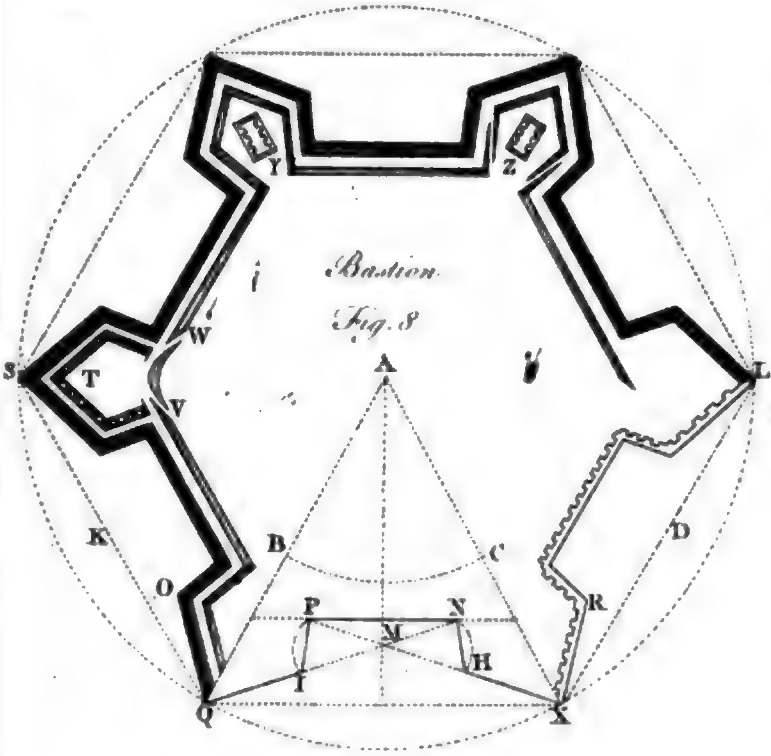
Fig. 6. Angle



Angle Fig. 7.


Y
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H
Q
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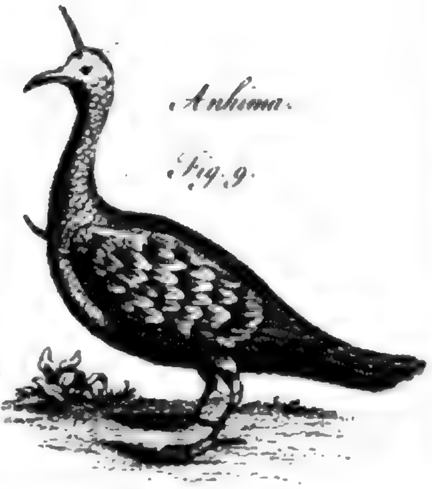
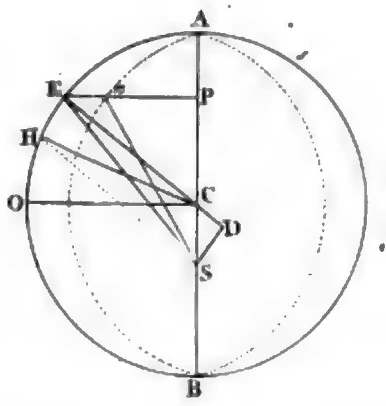
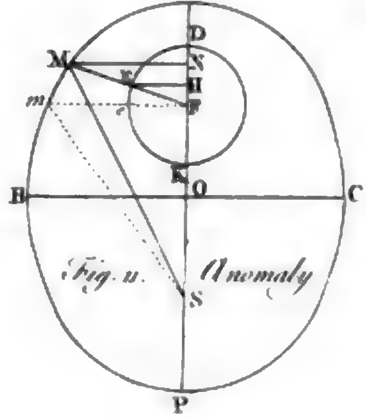
Bastion Fig. 8



Anhima. Fig. 9.



Anomaly. Fig. 10.


A
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S
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Fig. 11. Anomaly

or ſome intermediate one between that and ſixty degrees. See FORTIFICATION.

Solid BASTION is that which has the void ſpace filled up entirely, and raiſed to an equal height with the rampart.

Void or *Hollow* BASTION is that which is only ſurrounded with a rampart and parapet, having the ſpace within void or empty.

Flat BASTION is a baſtion built in the middle of the curtain, when it is too long to be defended by the baſtions at its extremities.

Cut BASTION is that whoſe point is cut off, inſtead of which it has a re-entering angle, or an angle inwards, with two points outwards; and is uſed, either when the angle would, without ſuch a contrivance, be too acute, or when water, or ſome other impediment, prevents the baſtion from being carried to its full extent.

Compoſed BASTION is when two ſides of the interior polygon are very unequal, which alſo renders the gorges unequal.

Deformed BASTION is when the irregularity of the lines and angles cauſes the baſtion to appear deformed or out of ſhape.

Demi BASTION is compoſed of one face only, has but one flank, and a demi-gorge.

Double BASTION is that which is raiſed on the plane of another baſtion.

Regular BASTION is that which has its true proportion of faces, flanks, and gorges.

BASTON, in law, implies a ſervant to the warden of the Fleet-priſon, who attends the king's courts with a red ſtaff, for taking into cuſtody ſuch perſons as are committed by the court.

BASTON, or BATOON, in architecture, is a kind of moulding in the baſe of a column, called alſo a tore.

BASTON, or BATOON, in heraldry, is a kind of bend which has only one half of the uſual breadth. It reſembles a truncheon, and is the proper mark for baſtardy.

BAT, in natural hiſtory, a kind of mungrel, or amphibious ſort of animal, partaking both of the mouſe and bird, and flying though without feathers.

The bat, which the Latins called veſpertilio, ſeems to be a medium between the quadruped and the feathered kinds. They lay themſelves up during the winter in the drieſt receſſes of caverns; where, fixing their talons to the roof, they cover their bodies with their wings, and in that poſition ſleep for ſeveral months.

BATABLE *Ground*, the lands which lay between Scotland and England, when the kingdoms were diſtinct, and to which both nations pretended a right.

BATCHELOR, or BACHELOR, a ſingle man, who has never been married.

BATCHELOR was, formerly, a title given to thoſe who had obtained the honour of knighthood; but had not a ſufficient number of vaſſals to carry their banner before them in the field of battle.

BATCHELORS, in the univerſities, are perſons who have attained to the *baccalaureate*, or taken the firſt degree in the liberal arts or ſciences.

BAT-FOWLING, a method of catching birds in the night by lighting large candles, or torches, near the place where they are at rooſt; for, upon beating them up, they fly immediately to the flame, where they are eaſily caught in nets, or beat down with buſhes faſtened to the ends of poles.

BATH, *Balneum*, a ſufficient quantity of water collected in ſome convenient receptacle for perſons to waſh themſelves in, either for health or pleaſure: and is either hot or cold.

Hot BATHS, called by the ancients thermæ, produce the moſt ſalutary effects in a great number of diſeaſes; and owe their origin partly to an admixture of ſulphureous particles, while the water is paſſing through the ſubterraneous canals, and partly to the fumes or vapours exhaling through the pores of the earth, where ſulphur is found either pure or impure, as in coals, amber, iron, nitre, &c.

The principal hot baths in our country, are thoſe at the city of Bath in Somerſetſhire; and thoſe at Buxton and Matlock in Derbyſhire. In the above city are four hot baths: one triangular, called the croſs-bath, the heat of which is more gentle than that of the reſt, becauſe it has fewer ſprings; the ſecond is called the hot-bath, from its being formerly much hotter than the reſt, but was then not ſo large as at preſent: the other two are called the king and queen's baths, and are divided only by a wall; the laſt has no ſpring, but receives its water from the king's bath. Each are furniſhed with a pump to throw out the water upon the patient, where that is required.

Theſe waters abound with a mineral ſulphur; they are hot, of a bluiſh colour, and ſtrong ſcent. They do not paſs through the body like other waters, unleſs ſalt be added, when they purge immediately. At the bottom of theſe baths is found a black mud, which is uſed with ſucceſs in aches and pains. The croſs-bath preys upon ſilver, all of them on iron, but none on braſs.

Theſe baths are found of great uſe in diſorders of the head, as palſies, &c. in cuticular diſeaſes, as the leproſy, &c. obſtructions and conſtipations of the bowels, the ſcurvy, ſtone, and in moſt diſeaſes of women and children. They are uſed as a laſt remedy in obſtinate chronic diſeaſes, where they ſucceed very well if they agree with the conſtitution of the patient.

Cold BATHS were held by the ancients in the greateſt eſteem; and the preſent age can boaſt of abundance of noble cures performed by them, and ſuch as were long attempted in vain by the moſt powerful medicines.

Bathing will always act the part of a diuretic, and plunging over head in cold water, eſpecially in that of the ſea, will do more in the cure of melancholy, madneſs, and particularly that occaſioned by the bite of a mad dog, than any other medicine. There is nothing better adapted to the cure of frigidity, when owing to a former exceſs of venery, than the cold bath. It will alſo contribute its ſhare to the cure of a ſimple gonorrhœa, and fluor albus. It is often ſucceſsful in a palſy; and thoſe who uſe it frequently are little affected with the changes of the weather.

Artificial BATHS are of various kinds, and adapted to various diſorders; ſome are made of cephalic and nervous drugs boiled in light and pure water.

For preparing baths of this kind, we principally make uſe of bay leaves, baum, ſouthernwood, marjoram, wild thyme, roſemary, hyſſop, clary, dried mint, penny-royal, feverfew, and the flowers of camomile and roſemary; all which are put into a bag with the addition of a few handfuls of common ſalt, and a little pot-aſh, and gently boiled in the water. In this medicinal water the patient is to be bathed in a bathing tub. It produces very happy effects in paralytic diſorders, imbecility, and weakneſs of the joints; and proves very ſerviceable to weak, cachectic, and cold conſtitutions; eſpecially in old patients, whoſe ſtrength is impaired, their nerves weakened, and the tone of the ligaments of their joints in ſome meaſure deſtroyed.

Vapour BATHS are where the vapours ariſing from burning ſpirits of wine, or from herbs boiled in wine, water, milk, &c. have immediate acceſs to either the whole body, or ſome particular parts. Theſe warm exhalations are of very ſingular efficacy in promoting ſweat, opening the ſubcutaneous ducts, ſoftening the hardened parts, relaxing ſuch as are tenſe and rigid, and diſſolving viſcous and tenacious humours. Vapour baths are therefore of ſingular ſervice in cold diſtempers, anaſarcas, œdematous tumours, and where the limbs are become paralytic. In that terrible ſpecies of teneſmus which generally accompanies a dyſentery, the ſteams of milk in which elder-flowers have been boiled, afford inſtantaneous relief.

BATH, in antiquity, a meaſure of capacity uſed among the Jews, containing the tenth part of an omer, or ſeven gallons and four pints as a liquid meaſure; or three pecks and three pints as a dry meaſure.

BATHS, in architecture, ſuperb buildings erected by the ancients for the ſake of bathing.

Knights of the BATH, a military order in England, inſtituted according to ſome authors by Richard II. who confined their number to four; but others ſay that it was founded by Henry IV. in the year 1399, and their number limited to forty-ſix.

Their motto is *tres in uno*, alluding to the three theological virtues.

Bath-Kol, the daughter of a voice, a name given by the Jews to one of their oracles. It conſiſts of a fantaſtical method of predicting future events by the firſt words they hear from any perſon's mouth, and which they conſider as a voice from heaven to inſtruct them in the matter they are enquiring about.

Bath-Metal, a mixed metal, conſiſting of copper combined with zinc, and generally called prince's metal. See Prince's Metal.

BATMAN, in commerce, a kind of weight uſed at Smyrna, containing ſix okes, of four hundred drams each, which amount to ſixteen pounds, ſix ounces, and fifteen drams Engliſh weight.

BATON, or Baston. See Baston.

BATRACHOMYOMACHIA, battle of the frogs and mice, the title of an elegant burleſque poem, commonly aſcribed to Homer.

The word is compounded of the Greek, βατραχος, a frog, μυς, a mouſe, and μαχη, battle.

The cauſe of this battle is the death of Pſycharpax, a mouſe, ſon to Taxartes, who being mounted on the back of Phyſignathus, a frog, on a voyage to her palace, to which ſhe had invited him, was ſeized with fear, on ſeeing himſelf in the middle of a pond, ſo that he tumbled off and was drowned. The mice ſuſpecting that Phyſignathus had ſhaken him off with deſign, demanded ſatiſfaction, and, by unanimous conſent, declared war againſt the frogs.

BATTALIA, an army drawn up in order of battle.

BATTALION, a ſmall body of infantry drawn up in order of battle, and ready to engage.

A battalion uſually contains from five to eight hundred men; but the number is not preciſely determined. They are divided into three companies, one of which is grenadiers. They are uſually drawn up with ſix men in file, or one before another. Some regiments conſiſt of one battalion only, while others are divided into four or five.

BATTEN, a name given by workmen to a ſcantling of wooden ſtuff, from two to four inches broad, and about an inch thick; the length is generally very conſiderable, but undetermined.

This term is chiefly uſed in ſpeaking of doors and window-ſhutters which are not framed with whole deal, &c. with ſtyles, rails and pannels, like wainſcot; but appear to the eye as if they were really ſuch, by means of theſe battens, bradded on the plain board round the edges, and ſometimes acroſs them up and down, in different manners, according as the workman would imitate this or that different kinds of wainſcot.

Battens *of the Hatches*, amongſt ſeamen, thin, long pieces of board or hoops, nailed along the edges of the tarpawlings which cover the hatches at ſea, to confine them cloſe to the hatch and prevent the water from running off the deck into the lower apartments of the ſhip. The tarpawling is a broad piece of tarred canvas. See Hatchway.

BATTERING, in the military art, implies the attacking a place, work, or the like with heavy artillery.

Battering-Pieces, are large pieces of ordnance, proper for battering a fortification. See Cannon.

Battering-Ram, a machine uſed by the ancients in ſieges, for battering the walls and towers of a fortified place.

The uſe of this machine is very ancient, and the invention of it aſcribed to different people. It was of two kinds, ſlung or unſlung.

The former was compoſed of a large beam of oak, reſembling a ſhip's maſt, of prodigious length and thickneſs, having the end armed with a head of iron proportioned to the body, and reſembling that of a ram, and thence it had its name. This terrible machine, which according to Vitruvius weighed 440000 pounds, was ſuſpended, and equally ballanced, like the beam of a pair of ſcales, with a chain, or a large cable, which ſupported it in the air in a ſtrong frame of timber, which was puſhed forwards, on the filling up of the ditch, to a certain diſtance from the wall, by means of rollers or wheels. The frame was ſecured from being ſet on fire by the beſieged, by ſeveral coverings, with which it was then caſed over.

Plate XIII. *fig.* 1. repreſents the battering ram ſuſpended. 2. The ram. 3. The form of its head, faſtened to the enormous beam by three or four bands of iron, four feet in breadth. At the extremity of each of theſe bands (4) was a chain of the ſame metal, one end of which was faſtened to a hook, (6) and at the other extremity of each of theſe chains was a cable firmly bound to the laſt link. Theſe cables ran the whole length of the beam to the end of the ram (7), where they were all bound together as faſt as poſſible with ſmall ropes. To the end of theſe cables another was fixed, compoſed of ſeveral ſtrong cords platted together to a certain length, and then running ſingle (8). At each of theſe ſeveral men were placed, to balance and work the machine. 10. The chain or cable by which it hung to the croſs beam (11), fixed on the top of the frame.

The unſuſpended ram differed from this only in the manner of working it: for, inſtead of being ſlung by a chain or cable, it moved on ſmall wheels on another large beam.

Battering-Ram, in heraldry, is a bearing, or coat of arms, reſembling the military engine of the ſame name.

BATTERY, in the military art, a parapet thrown up, or formed of faſcines, &c. for covering the gunners, &c. from the ſhot of the enemy.

All field batteries conſiſt of four chief parts, namely, the ditch, the parapet, the platform, and the magazine.

The ditch is uſually dug in the front and ſides, and ſometimes quite round; and ſerves not only to furniſh the earth neceſſary for the parapet, but it alſo prevents the enemy from entering the battery ſo readily as he might otherwiſe do. The ditch in front is commonly eighteen or twenty feet broad, and the depth about ſeven or eight feet; the ſides ſloping towards the bottom, which is about ſix feet wide: but the ditches on the ſides are about ten feet wide, and ſix feet deep. Theſe are the dimenſions uſually given; but the general practice ſeems to be, only to get earth ſufficient for the work, and not mind the regularity of the ditch; for as theſe works in attacks are uſually done by night, the keeping ſtrictly to the aſſigned dimenſions is hardly practicable.

The parapet is generally raiſed about three or four feet diſtant from the brink of the ditch, the ſpace left between, called the berm or foreland, ſerving to lodge the rubbiſh beat down by the enemies ſhot, that it may not fall into the ditch.

The thickneſs of the parapet ſhould be about eighteen or twenty feet, in order to be cannon-proof, and about ſeven or eight feet high, when the enemy has no command above the battery: but if they have a command over this height, the parapet ſhould be raiſed high enough to cover the men when they load the guns.

The length of the parapet depends on the number of guns to be employed in the battery.

Thus, for one gun allow eight yards in length; and ſix yards more for every other gun: ſo two guns have fourteen yards, three guns twenty yards, four guns twenty-ſix yards, &c.

There ſhould be great care taken that the battery be not enfiladed or raked by the enemies cannon: neglects of this kind are often fatal to the officers and gunners, as was well known at the ſiege of Carthagena, anno 1741: but this is eaſily prevented by raiſing at one or both ends of the parapet, a bank acroſs the battery called an epaulement, of the ſame thickneſs and height with the parapet, and about fifteen or eighteen feet long.

The parapet conſiſts of two parts, namely, the wall and the merlons.

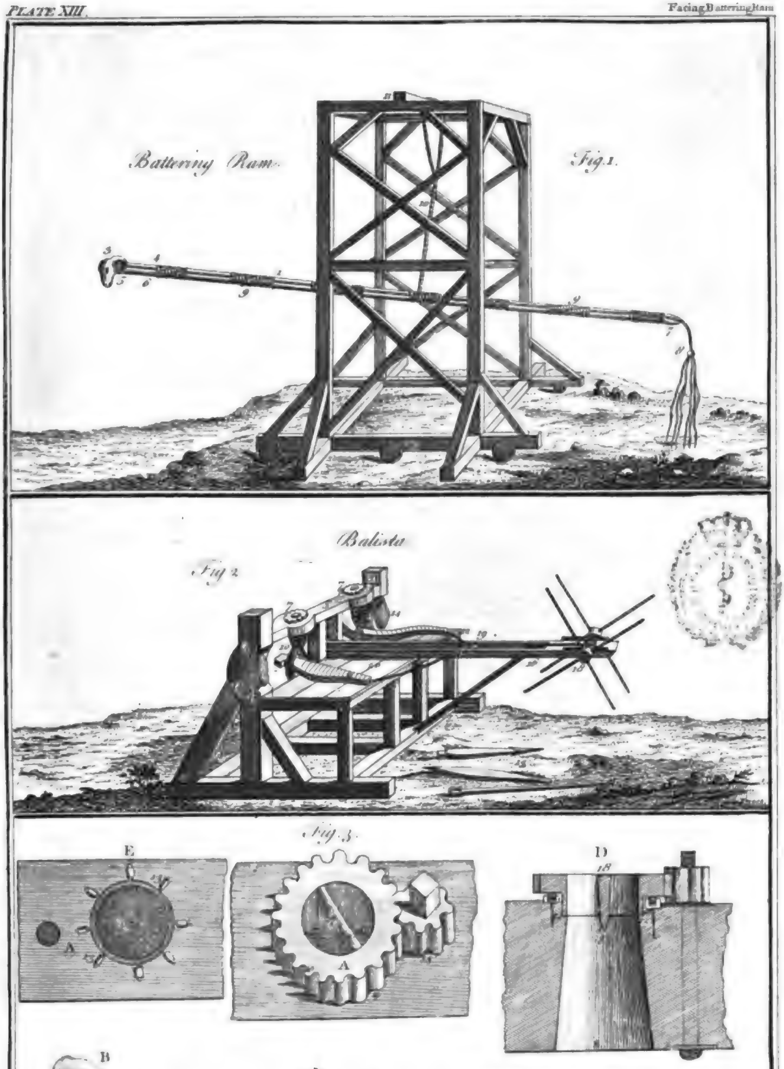
The wall is that part of the parapet which is contained in one piece from end to end, and is about two and a half or three feet high.

The merlons are detached pieces of the parapet, leaving openings called embraſures, through which the cannon deliver their ſhot.

The embraſures ſhould, as much as is poſſible, be cut perpendicular to the parapet; therefore the battery ſhould be parallel, or nearly ſo, to the object to be battered: for

PLATE XIII.

Facing Battering Ram


Battering Ram
Fig. 1.
Balista
Fig 2.
Fig. 3.
E
A
D
18
B
Catapulta
C

direct ſhots have moſt force; and oblique embraſures weaken the merlons, or parts of the parapet ſtanding between the embraſures.

The embraſures are uſually about two or two and a half feet wide on the inſide, and about nine or ten feet on the outſide; whereby the cannon may be traverſed from the right to the left, ſo as to command a pretty large extent in front. The diſtance from the middle of one embraſure to the middle of the next ſhould be about eighteen feet, in order to leave ſufficient room for the working of the guns, and the ſtowage of the ſhot and other neceſſaries.

Platforms are generally laid ſloping towards the parapet nine or ten inches; this carries off the rain, prevents the gun from recoiling ſo much when fired, as it would do if laid level; and, when loaded, it is more eaſily brought to the embraſure.

In temporary batteries, the platforms are made of planks laid acroſs ſome ground timbers or ſleepers: there is uſually a platform made to each gun; it is about eighteen feet long, eight feet broad next the parapet, and about fourteen feet broad at the tail, the intermediate ſpaces between the platforms ſerving for the ſhot and other neceſſaries.

When a platform is to be laid on marſhy ground, firſt lay a floor or two of faſcines; cover theſe with hurdles of twelve or fifteen feet long, and ſix or ſeven broad; on theſe lay a floor of three or four inches of earth, and therein lay the ſleepers, and over theſe the planks.

When a battery is built of ſtone or brick, the platform is generally a flat-ſtone pavement ranging the whole length of the battery: this, on account of its reſiſting the injuries of the weather for a long time, is to be preferred to planks; but, in caſe of a bombardment, ſuch a platform is to be avoided, becauſe the ſhells will not only break the pavement, but alſo, by driving about the broken ſtones, do the troops much miſchief.

The magazine to a field battery is uſually made about fifty or ſixty yards behind the platform: it is a cavity dug in the ground, about four feet deep; the earth whereof is thrown between the pit and the platform; the ſides of the pit are ſometimes planked round to keep it dry, and prevent the earth from crumbling in; and the powder barrels placed herein are covered with hurdles and earth, or tanned hides, to preſerve the powder from wet and fire.

The communication to the magazine is by a ſloping trench beginning to deſcend about five or ſix yards behind the platform; and the earth thrown on that ſide where it will moſt conveniently cover the perſons who remove the barrels of powder from the great magazine to the battery or ſmall magazine.

When there are many cannon in battery, and the ſervice is quick, it is cuſtomary to have to every two pieces a ſmall magazine to hold 20 or 30 barrels of powder: this is placed about 15 or 20 yards behind the platform, and againſt the merlon between the cannon; and as theſe barrels are uſed, they are replaced by others from the great magazine.

At each magazine a centinel is placed to prevent accidents; and to prevent perſons coming into the battery and magazines who have no buſineſs there, a trench is ſometimes dug behind the magazine, and carried into the trenches which communicate between the magazine and battery.

To conſtruct a Faſcine BATTERY.—For one gun provide faſcines of 9 feet, 600; of 6 feet, 100; of 3 feet, 120.

And, for every other piece of 9 feet, 400; of 6 feet, 100; of 3 feet, 100; each faſcine being about nine inches thick; and let there be three or four pickets for every faſcine, for many will break in driving.

Trace the limits of the parapet in two parallel lines about eighteen feet diſtant, allowing eight yards in length for one gun, and ſix yards for every other gun; and along theſe lines cut a trench about half a ſpade deep.

Lay a row of nine feet faſcines along one trench, obſerving that their ends be well jammed one into the other, and let each be pegged down with two pickets, drove into the ground till the head is ſunk into the faſcine.

Cloſe to this row lay another, letting the two end ones be of ſix feet, and the reſt nine feet, whereby the joinings in this row will not fall againſt the joinings in the firſt row: let theſe be alſo ſtaked down as before. Cloſe to the ſecond row lay a third all of nine feet. Cloſe to the third lay a fourth, the two end ones being ſix feet, and the reſt nine feet. In this manner lay the rows of faſcines within the limits ſtaked out, which will be covered with twenty-four rows; then over this floor of faſcines ſprinkle earth to fill up the hollows, and let the whole be trod or rammed down.

On the firſt floor lay a ſecond, obſerving, that as in the firſt floor every ſecond row ended with ſix feet faſcines; ſo in the ſecond floor let every odd row end with ſix feet ones, whereby the joinings of no two faſcines in this floor will fall over the joinings of the faſcines below them. Let the outſide rows in the ſecond floor be ſo placed over thoſe of the lower, that there be a little ſloping preſerved, the work narrowing upwards. The pickets which ſtake down this floor are to be drove up to the head, and the channels or hollows in the floor are to be filled up with earth. In this manner lay four floors, which will raiſe the work to about two and a half or three feet; and that part of the breaſt-work called the wall will be compleated.

Meaſure from each end of the wall twelve feet, there drive a ſtake; and plant other ſtakes at every intermediate eighteen feet: this being done on the inſide of the wall, let other ſtakes be planted on the outſide, either directly oppoſite the former, or in the line towards the place where the gun is more particularly intended to deliver its ſhot. Plant other ſtakes on the inſide, one a foot diſtant on each ſide the former, and this will leave ſpaces of two feet each for the inner opening of the embraſures: then, on the outſide, plant other ſtakes at five or ſix feet diſtance from the former ones, one on each ſide, and ſpaces of ten or twelve feet will be marked out for the outſide openings of the embraſures.

In the direction of the pickets which limit the inner and outer openings of the embraſures, let ſingle rows of faſcines be ſtaked down acroſs the wall, and theſe will be the ſides of the embraſures; fill the intermediate ſpaces or merlons with rows of faſcines laid lengthwiſe to the wall, and this will be the firſt floor of the merlon, which is to be picketed down, and the hollows filled with earth as before directed. Let other floors be raiſed in like manner, until the merlons are carried up to about five or ſix feet, or more, if neceſſary; and on the top of each let a bed or floor of earth be laid of about eight or twelve inches thick.

Acroſs the top of the inner opening of the embraſure, either lay a bundle or 10 or 12 faſcines bound together, or as many ſtuffed into a kind of baſket open at both ends, and the bundle well ſtaked to the merlons.

Provide a blind made of planks three or four inches thick, to fit the inner opening of the embraſure, which is to be put up, while the gunners are loading the piece, to preſerve them from the fire of the muſketry.

The cheeks or ſides of the embraſures are to ſlope ſo, as to have the top wider than the bottom; which not only leaves a greater opening for the blaſt of the gun, but theſe ſlopes in works of this kind give a greater degree of ſtrength to ſupport themſelves againſt the thruſt of the upper parts.

Againſt each embraſure lay on the ground five pieces of timber called ſleepers, of about eighteen feet long, and ſix or eight inches ſquare; let the ends next the embraſure be placed at ſuch a diſtance from one another, that the diſtance from out to out be about ſix feet, the other ends ſpreading about twelve or fourteen feet from out to out; drive two ſtakes of about three inches ſquare into the ground on both ſides of each end of every ſleeper, whereby they will be kept ſteady in their places, and let the earth be well rammed and beat up cloſe to them: but obſerve to let the tails of the ſleepers be raiſed about ſix or eight inches higher than the ends next the wall, to prevent the cannon from recoiling too much when fired.

Cover the ſleepers with planks of about two inches thick laid croſswiſe; that next the embraſures being about eight feet long, the reſt gradually increaſing, ſo that the plank at the tail be about fourteen feet long; and let the planks be nailed to the ſleepers.

On this floor fix a piece of timber of about ſix or eight inches ſquare next the embraſure, to ſerve as a ſpur for the carriage wheels to knock againſt (and is therefore uſually called the knocker) when the gun is run up to the wall; obſerving that the ſpur be laid parallel to the object to be battered.

The whole platform ſhould be of oak, if it can be had.

If there is any danger of the batteries being raked by the enemies cannon, let an epaulement or ſcreen be raiſed at one or both ends of the parapet, joining to it, and conſtructed by floors of faſcines, as before ſhewn: then, all the ſtraggling twigs of the faſcines being cut off, the battery is conſtructed.

A battery thus made will do in caſe of haſte, and where earth enough is not eaſily had: but as it is ſubject to be fired when the wood is dry, it is not ſo much in uſe as another ſort called a coffer battery, eſpecially where wood is ſcarce and earth plenty.

A Coffer BATTERY is that where the ſides of the wall and merlons only are formed of faſcines, and all the cavities or included ſpaces filled with earth.

The place of the battery being determined, make out, with a line of ſome kind, the limits of the parapet of about eighteen or twenty feet thick; and three or four feet before the parapet mark out with lines, or ſtakes, the limits of the ditch of about ten or twelve feet broad, or more, if earth is wanted, allowing eight yards in length for one gun, and ſix yards more for every other gun.

On the outlines of the parapet, cut a trench of about five or ſix inches wide and deep, and therein lay a row of faſcines, the ends being jammed one into the other; let theſe be ſtaked down: lay on them another row, ſo that the joinings of theſe be not directly over the joinings of the lower one, and the knots of all the bands turned inwards; ſtake theſe down, and on them lay in like manner a third and a fourth row, &c. until the height be about three feet. The ſame kind of work being done at the ends, and for the epaulement, if wanted, the coffer for the wall will be made.

Then let the men be diſpoſed along the place intended for the ditch, and with the proper tools break the ground, and throw it into the coffer, where another ſet of men are, as the earth is thrown in, to ſpread it and ſtamp it down with rammers; and this work is to be continued until the coffer is filled.

When the wall is finiſhed, let the embraſures be ſtaked out as before, and a coffer formed in like manner, as for the wall, for each merlon, which is alſo to be filled with earth, and rammed down.

The other articles in the preceding battery are to be followed in this, the only difference being in the making of the parapet.

When a proper place for a temporary battery is deſtitute both of dry earth and wood; then materials muſt be carried to the place; theſe uſually are gabions and earth-ſacks.

To make a Gabion BATTERY.—Along the line pitched out for the battery, let the gabions be planted in the places where the merlons are to be: the gabions uſed are of five, ſix, and ſeven feet in diameter, and eight feet high. Each merlon muſt have ſeven; that is, three within of ſix feet diameter, next two of ſeven feet diameter, and, on the outſide, two of five feet diameter; obſerving to leave proper openings for the embraſures, of about two feet on the inſide, and nine or ten on the outſide.

Or thus: let the merlons be made of gabions five feet diameter; then put four within, three in the middle, and two on the outſide; this conſtruction being rather ſtronger than the former.

The ends and epaulements are alſo formed by three rows of gabions.

The floors or bottoms of the embraſures are to be filled with gabions of about three feet high, and of a proper diameter, to fill up the ſpaces between the merlons.

The gabions being placed, they are to be filled with earth brought from the neareſt places that will afford it, in the earth-ſacks; or elſe they may be filled with dung, mingled with ſand; and, in caſes of neceſſity, they may be filled with large faggots, or billet-wood, obſerving that the voids between the gabions are alſo filled.

Batteries of this conſtruction are uſually made on marſhy or rocky ground.

BATTERY *d'Enfilade*, is that which ſcours or ſweeps the whole length of a ſtraight line.

BATTERY *en Echarpe*, is one that plays obliquely.

BATTERY *de Reverſe*, that which plays on the back of the enemy.

BATTERY *à Ricochet*, is when the cannon are not loaded with their full charge of powder, ſo that the balls may ſtrike the ground before they reach the place, and by riſing again leap over the wall and do execution among the beſieged.

Croſs BATTERIES are two batteries which play athwart one another, upon the ſame object, forming an angle, and beating with more violence and deſtruction; becauſe what one bullet ſhakes the other beats down.

Camerade BATTERY is when ſeveral guns play at the ſame time upon one place.

Sunk or *Buried* BATTERY is when the platform on which the guns are placed is ſunk into the earth, ſo that there muſt be trenches or embraſures cut in the earth, againſt the muzzles of the guns, for paſſages to the ſhot.

BATTERY *of Mortars*, differs from a battery of cannon, in being ſunk into the earth, and having no embraſures.

BATTERY, in law, the ſtriking, beating, or offering any violence to another perſon, for which damages may be recovered: but if the plaintiff made the firſt aſſault, the defendant ſhall be acquitted, and the plaintiff amerced to the king for his falſe ſuit.

Battery is frequently confounded with aſſault, though in law they are different offences; and the defendant may be found guilty of aſſault, though acquitted of the battery: there may therefore be an aſſault without a battery; but battery always implies an aſſault. See ASSAULT.

BATTEURS *d'Eſtrade*, are ſcouts ſent out on horſeback before the front, and on the wings of an army, ſome miles, diſtance to make diſcoveries.

BATTLE, a general engagement between two armies, in a country ſufficiently open for them to encounter in front, and for the greater part at leaſt of the line to engage. Other great actions, though of a longer duration, and perhaps attended with greater ſlaughter, are only called fights.

Naval BATTLE. See DIVISION, ENGAGEMENT, LINE, SQUADRON.

BATTLE is alſo uſed figuratively for a repreſentation of a battle in ſculpture, painting, &c.

BATTLE-ROYAL, among ſportſmen, implies a fight between three, five, or ſeven cocks, all engaged together, ſo that the cock which ſtands longeſt wins the battle.

BATTLE-AX, a kind of halbert formerly uſed by the infantry, and firſt introduced into England by the Danes.

BATTLEMENTS, in architecture, are indentures or notches in the top of a wall, or other building, in the form of embraſures.

BATTOLOGY, in grammar, implies a ſuperfluous repetition of ſome words or ſentences.

BATTON, or BATTOON. See BASTON.

BATTORY, in commerce, a name given by the Hanſe-towns to their warehouſes in foreign countries.

BAVARIA, one of the circles of the German empire, lying between Auſtria on the Eaſt, and Swabia on the Weſt. The duke of Bavaria is one of the nine electors.

BAVINS, in the military art, are faggots of bruſh wood, with the bruſh at length.

BAUM, *Meliſa*, in botany, a plant with ſquare ſtalks, and oblong, pointed, dark green, and ſomewhat hairy leaves, ſet in pairs; in the boſoms of which come forth pale, reddiſh, labiated flowers, ſeveral of which ſtand together on one pedicle, with the upper lip roundiſh, erect and cloven, and the lower divided into three ſegments. It is perennial; a native of mountainous places in the ſouthern parts of Europe; and flowers in our gardens in June.

This plant, formerly celebrated for cephalic, cordial, ſtomachic, uterine, and other virtues, is now juſtly ranked among the milder corroborants. It has a pleaſant ſmell, ſomewhat of the lemon kind, and a weak aromatic taſte; of both which it loſes a conſiderable part on being dried; a ſlight roughiſhneſs with which the herb is accompanied, becoming at the ſame time more ſenſible.

The infuſions of this plant are ſometimes drank as tea in chronical diſorders proceeding from debility and relaxation, and ſometimes, acidulated with lemon juice, as a diluent in acute diſorders. The diſtilled water is pretty ſtrongly impregnated with the grateful flavour of the plant; and the eſſential oil, which is of a yellowiſh colour and very fragrant ſmell, is recommended by Hoffman as an excellent corroborant of the nervous ſyſtem.

BAY, a gulph or inlet of the ſea-coaſt, comprehended between two capes or points of land, where veſſels frequently ride at anchor ſheltered from the wind.

Bay, among farmers, that part of a barn where the corn is laid up, or the mow made. Thus if a barn conſiſt of a floor and two heads, they call it a barn of two bays.

Bay is alſo one of the colours of the coat of horſes, and has, perhaps, its name from reſembling the colour of dried bay-leaves.

There are various degrees of this colour from the lighteſt bay to the dark, that approaches the neareſt to the brown, but always more gay and ſhining. The bright bay is an exceeding beautiful colour, becauſe a bright bay horſe has often a reddiſh daſh with a gilded aſpect, his mane and tail black, with a black or dark liſt down his back. The middle colours of bay alſo have often the black liſt with black mane and tail; and the dark bays have almoſt always their knees and paſterns black, and we meet with ſeveral ſorts of bays that have their whole limbs black from their knees and hocks downwards. The bays that have no liſts down their backs, are, for the moſt part, black over their reins, which goes off by an imperceptible gradation from dark to light, towards the belly and flanks: ſome of theſe incline to a brown, and are more or leſs dappled.

The bay is one of the beſt colours, and horſes of all the different kinds of bays are commonly good, unleſs when accidents happen to ſpoil them when they are colts. *Gibſon on Horſes.*

Bay, among huntſmen, is a term applied to a deer, which after having been hard run, turns about, and defends himſelf with his horns againſt the dogs; in which caſe he is ſaid to ſtand at bay.

Bay-Salt. See Salt.

Bay-Tree. See Laurus.

BAYONET, in the military art, implies a ſhort broad dagger, with a hollow handle of iron, of a circular form, fitted to the muzzle of the piece where it is faſtened; ſo that the ſoldier fires with the bayonet on the muzzle of his piece, and is always ready to act againſt the horſe.

BAYS, in commerce, a ſort of open woollen ſtuff, having a long nap, ſometimes frized, and ſometimes not. It is without any wale, and wrought in a loam with two treddles like flannel.

Bays are chiefly manufactured at Colcheſter and Bockin in Eſſex. The exportation of this ſtuff was formerly more conſiderable than at preſent, the French having now learned the manufacture. The Engliſh bays are, however, ſtill ſent in great quantities to Spain and Portugal, and even to Italy. Their chief uſe is for cloathing the monks and nuns, and for lining the ſoldiers cloaths. The looking-glaſs makers alſo uſe bays behind their glaſſes to preſerve the tin foil.

The breadth of bays is commonly from a yard and a half to two yards, and the length from forty-two to forty-eight.

BAZAR, or Bazaard, among the eaſtern nations, a market, or place deſigned for trade.

BAZAT, in commerce, a long, fine cotton, brought from Jeruſalem, and is thence often called Jeruſalem cotton.

BDELLIUM, in the materia medica, a gummy reſinous juice, flowing from an oriental tree of which we have no deſcription. It is brought from Arabia and the Eaſt Indies in pieces of different magnitudes, of a dark reddiſh brown colour externally, not unlike myrrh; but internally clear, and ſomething reſembling glue. It is of an agreeable ſmell, and a bitteriſh ſlightly pungent taſte.

This gummy reſin is recommended as a corroborant and attenuant in diſorders of the breaſt, for promoting urine and the menſes, and externally for reſolving or maturating hard tumours; but is at preſent little uſed.

BEACON, a ſignal erected on ſome hill or eminence, for giving notice of the invaſion of an enemy.

It conſiſts of pitch-barrels placed upon high poles, and when the enemy appears, the barrels are ſet on fire; ſo that the flame in the night time, and the ſmoak in the day, ſpreads the alarm through the whole country.

Beacon alſo ſignifies a mark erected as a warning to ſeamen againſt rocks, ſhelves, or ſands.

BEACONAGE, the tax paid for maintaining a beacon.

BEAD, in architecture, a round moulding, commonly made upon the edge of a piece of ſtuff, in the Corinthian and Compoſite orders, cut or carved in ſhort emboſſments, like beads in necklaces.

Sometimes a plain bead is ſet on the edge of each faſcia of an architrave, and ſometimes even an aſtragal is cut in this manner. A bead is often placed on the lining board of a door-caſe, and on the upper edges of ſkirting-boards.

Bead-Proof, among diſtillers, a fallacious method of determining the ſtrength of ſpirits.

It conſiſts in ſhaking a ſmall quantity of the ſpirits in a phial, when if the crown of bubbles ſtand for ſome time on the ſurface, the goods are eſteemed proof, that is, equal parts of rectified ſpirits and phlegm.

BEAGLE, the name of a particular kind of hunting-dogs, of which there are ſeveral ſorts.

BEAK, the bill or nib of a bird, from the form and ſtructure of which Linnæus divides the whole claſs into ſix orders. See Bird.

Beak, in architecture, the ſmall fillet left on the head of a larmier, which forms a canal, and makes a kind of pendant.

Chin Beak, a moulding the ſame with the quarter-round, except its ſituation, which is inverted.

Beak-Head, in naval architecture, the name given to a ſhip's head whoſe fore-caſtle is ſquare; a circumſtance common to all veſſels of war that have two or more decks of guns. In ſmaller ſhips, the fore-caſtle is generally ſhaped like a parabola, whoſe vertex lies immediately above the ſtem. The ſtrong projecting pointed beaks uſed by the ancients in time of battle, are entirely diſuſed ſince the invention of gun-powder.

BEAKED, in heraldry, a term uſed to expreſs the beak or bill of a bird. When the beak and legs of a bird are of a different colour from that of the body, they ſay beaked and membered of ſuch a tincture.

BEAM, in architecture, is the largeſt piece of wood in a building, being laid acroſs the walls, and ſerving to ſupport the principal rafters of the roof.

No houſe has more than two of theſe beams, viz. one at each head: into theſe the girders of the garret floor are alſo framed, and if the building be of timber, the teazle-tenons of the poſts.

The proportion of beams near London are fixed by ſtatute, as follows: a beam 15 feet long muſt be 7 inches on one ſide its ſquare, and 5 on the other: if it be 16 feet long, one ſide muſt be 8 inches, the other 6; if 17 feet long, one ſide muſt be 10 inches, the other 6: in the country they uſually make them ſtronger. Sir H. Wotton adviſes theſe to be of the ſtrongeſt and moſt durable timber.

Herrera tells us, that in Fer. Cortez's palace, in Mexico, there were 7000 beams of cedar: but he muſt certainly uſe the word beam in a greater latitude than we do. In effect, the French, under *poutre*, beam, take in not only the pieces which ſupport the rafters, but alſo thoſe which ſuſtain the joiſts for the cieling.

Some of the beſt authors among the French have conſidered the force or ſtrength of beams, and brought their reſiſtance to a preciſe calculation, particularly M. Varignon and M. Parent. The latter has ſhewn us, that if a beam, in form of a parallelopipedon, be fixed horizontally in a wall, its reſiſtance againſt breaking at the place of its inſertion will be as the area of the ſection at the wall and the depth of the beam directly, and the length reciprocally.

Let R and r repreſent the reſiſtances of two beams, fixed as above, whoſe lengths, breadths, and depths are L, B, D, and l, b, d, reſpectively: then will $R : r :: \frac{B \times D^2}{L} : \frac{b \times d^2}{l}$.

If P and p repreſent the reſpective weights that, being appended at the extremities of their lengths, are ſufficient to break thoſe beams, we ſhall have $\frac{B \times D^2}{L} = P$, and $\frac{b \times d^2}{l} = p$; therefore $P \times p = \frac{B \times D^2 \times l + L \times b \times d^2}{L + l}$.

If the beam be fixed at both ends, then $B = b$, and $D = d$, whence $P + p = \frac{B \times D^2 \times \overline{L + l}}{L \times l}$, which ſhews that the forces requiſite to break a beam in different points of its length, are as the rectangles of the ſegments of the length; for $B \times D^2 \times \overline{L + l}$ being conſtantly the ſame, it follows, that $P + p$ is as $\frac{1}{L \times l}$; and, therefore, when $L = l$, $P + p$ will be the leaſt poſſible; conſequently a beam ſupported at both ends will require a leſs weight to break it in the middle, than at any other point of its length.

Hence if the baſes of two beams be equal, though both their heights and breadths be unequal, their reſiſtance will be as their heights alone; and, by conſequence, one and the ſame beam laid on the ſmalleſt ſide of its baſe, will reſiſt more than when laid flat, in proportion as the firſt ſituation gives it a greater height than the ſecond: and thus an elliptic baſe will reſiſt more, when laid on its greateſt axis, than when on its ſmalleſt.

Since in beams equally long, it is the baſes that determine the proportion of their weights or ſolidities, and ſince their baſes being equal, their heights may be different; two beams of the ſame weight may have reſiſtances differing to infinity: thus, if in the one the height of the baſe be conceived infinitely great, and the breadth infinitely ſmall, while in the other the dimenſions of the baſe are infinite; the reſiſtance of the firſt will be infinitely greater than that of the ſecond, though their ſolidity and weight be the ſame. If therefore all required in architecture were to have beams capable of ſupporting vaſt loads, and at the ſame time be of the leaſt weights poſſible, it is evident they muſt be cut as thin as laths, and laid edgewiſe.

If the baſes of two beams be ſuppoſed unequal, but the ſum of the ſides of the two baſes equal, E. g. if they be either 12 and 12, or 11 and 13, or 10 and 14, &c. ſo that they always make 24; and farther, if they be ſuppoſed to be laid edgewiſe; purſuing the ſeries, it will appear that, in the beam of 12 and 12, the reſiſtance will be 1728, and the ſolidity or weight 144; and that in the laſt, or 1 and 23, the reſiſtance will be 529, and the weight 23: the firſt therefore, which is ſquare, will have leſs than half the ſtrength of the laſt, with regard to its weight.

Hence M. Parent remarks, that the common practice of cutting the beams out of trees, as ſquare as poſſible, is ill huſbandry: he hence takes occaſion to determine geometrically what dimenſions the baſe of a beam to be cut out of any tree propoſed ſhall have, in order to its being of the greateſt poſſible ſtrength; or, which is the ſame thing, a circular baſe being given, he determines the rectangle of the greateſt reſiſtance that can be inſcribed; and finds that the ſides muſt be nearly as 7 to 5. To inveſtigate this proportion of the ſides, put r for the radius of the given circular baſe, $2x$ for the required depth; then will $2\sqrt{r^2 - x^2}$ expreſs the required breadth, by the nature of the circle; and conſequently $8x^2 \times \sqrt{r^2 - x^2}$ the reſiſtance, which muſt be a maximum; and therefore its fluxion $= 0$: hence we get $x = r \times \sqrt{\frac{2}{3}}$, and the proportion of the ſide as $\sqrt{2}$ to 1, or 1.4 to 1 nearly, that is, as 7 to 5.

Hitherto the lengths of the beams have been ſuppoſed equal; if they are unequal, the baſes will reſiſt ſo much the leſs as the beams are longer.

To this it may be added, that a beam ſuſtained at each end, breaking by a weight ſuſpended from its middle, does not only break at the middle, but alſo at each extreme; or, if it does not actually break there, at leaſt immediately before the moment of the fracture, which is that of the equilibrium between the reſiſtance and the weight, its fibres are as much ſtretched at the extremes, as in the middle. So that, of the weight ſuſtained by the middle, there is but one third part which acts at the middle, to make the fracture; the other two only acting to induce a fracture in the two extremes.

A beam may either be ſuppoſed loaden only with its own weight, or with other foreign weights, applied at any diſtance, or elſe only with thoſe foreign weights. Since, according to M. Parent, the weight of a beam is not ordinarily above $\frac{1}{12}$ part of the load given it to ſuſtain; it is evident that, in conſidering ſeveral weights, they muſt all be reduced by the common rules to one common center of gravity.

M. Parent has calculated tables of the weights that will be ſuſtained by the middle, in beams of various baſes and lengths, fitted at each end into walls, on a ſuppoſition that a piece of oak of an inch ſquare, and a foot long, retained horizontally by the extremes, will ſuſtain 315 lb. in its middle, before it breaks, which it is found, by experience, it will. See *Mem. Acad. R. Scienc. an.* 1708.

Beams, in naval architecture, thick ſtrong pieces of timber, ſtretching acroſs the ſhip from ſide to ſide, to ſupport the decks and retain the ſides at their proper diſtance.

On the **Beam**, in navigation, any diſtant object is ſo called, when it bears on a line with the ſhip's beams: thus, if a ſhip lies north and ſouth, any object on the beam muſt bear eaſt or weſt; and hence,

Before the **Beam** is an arch of the horizon included between a line, croſſing the ſhip at right angles, and the object ſeen in that ſituation: thus, if a ſhip ſteers north, and diſcovers another two points before the ſtarboard beam, ſhe bears E. N. E. and ſo of abaſt the beam.

Beam, in heraldry, the principal horn of a hart or buck.

Beam, among hunters, the main ſtem of a deer's head, or that part which bears the antlers, royals, and tops.

Beam, in mechanics, the lath, or iron, of a pair of ſcales.

Beam is alſo the name of a fiery meteor, in the form of a pillar.

Beam, or **Roller**, among weavers, is a long and thick wooden cylinder, placed lengthwiſe on the back part of the loom of thoſe who work with the ſhuttle. The threads of the warp are rolled upon the beam, and unrolls as the work proceeds.

Beam-Compass, an inſtrument conſiſting of a ſquare wooden or croſs-beam, having ſliding ſockets that carry ſteel or pencil points; and uſed in deſcribing large circles, where the common compaſſes are uſeleſs.

Beam *of an Anchor*, the ſhank, or longeſt part of an anchor. See Anchor.

Beam *of a Plough*, a name given by our farmers to the largeſt piece of timber in a plough, and to which all the parts of the plough-tail are fixed.

This beam is generally made of aſh, is ſtraight, and eight feet long in the common plough; but in the four-coultered plough, it is ten feet long, and arched at the upper part. The head of this beam lies on the pillow of the plough, and is raiſed higher, or ſunk lower, as that pillow is elevated or depreſſed by ſliding along the crow-ſtaves. Near the middle it has an iron collar, which receives the tow chain from the box; and the bridle chain from the ſtake or gallows of the plough, is fixed to it a little below the collar: ſome inches below this there is a hole, in which the coulter is faſtened; and below that are two other ſmall holes, through which the heads of the retches or irons that ſupport both the ſheat and the ſhare paſs. Farther backward ſtill is a large perforation, through which the body of the ſheat paſſes; and behind that, very near the extremity, is another hole, through which the piece called the binder ſheat paſſes. See Plough.

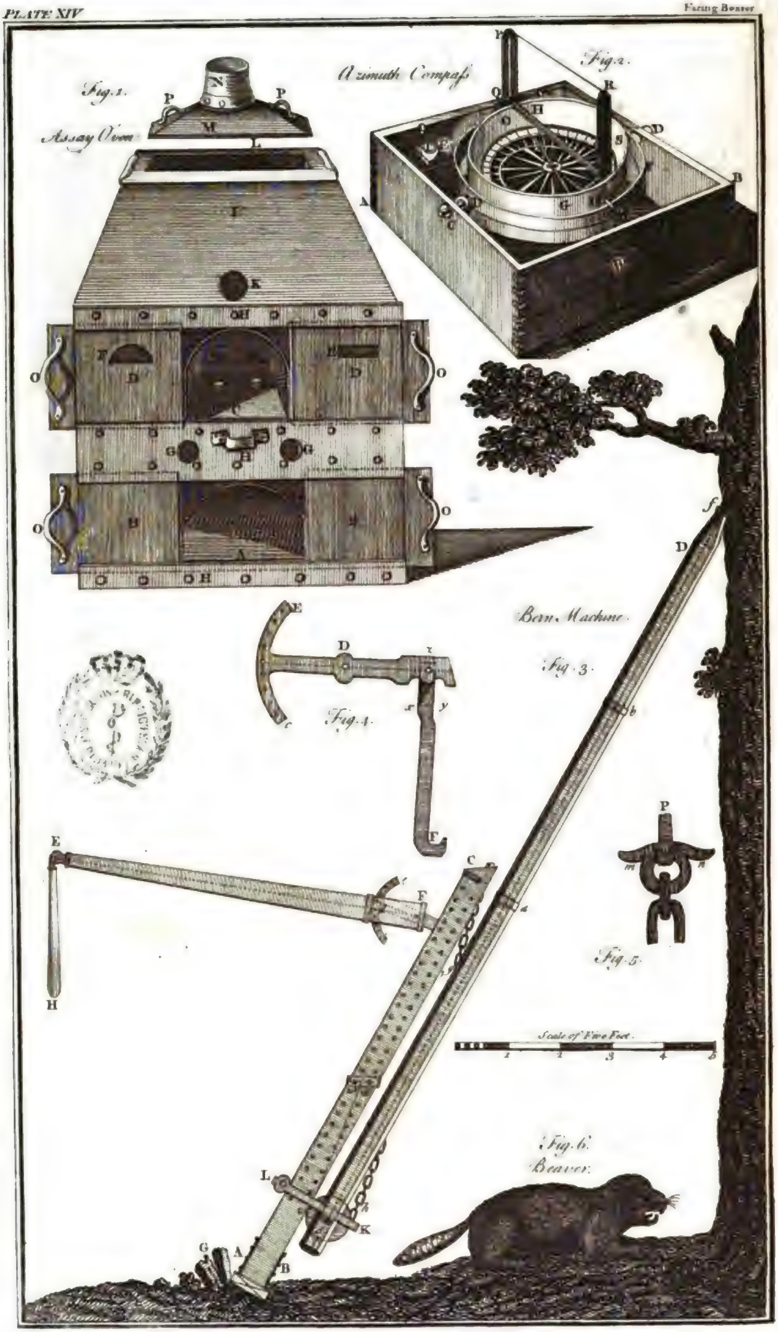


Fig. 1. Assay Oven.

Fig. 2. Azimuth Compaſs.

Bern Machine. Fig. 3.

Fig. 4.

Fig. 5.

Scale of Five Feet.

Fig. 6. Beaver.

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BEAN, *Faba*, in botany, the name of a genus of plants, whoſe flower is of the papilionaceous kind, and from its cup there ariſes a piſtil, which finally becomes a large pod, containing large, flatted, and, in ſome degree, kidney-ſhaped ſeeds. To this it is to be added, that the ſtalks are firm and erect, and the leaves ſtand by pairs, on a middle rib, which is terminated by an odd one.

Mr. Tournefort has enumerated eight ſpecies of this plant, but we have only the four following ſorts, commonly ſowed in our gardens. 1. The ſmall Liſbon. 2. The Spaniſh. 3. The Sandwich. And, 4. The Windſor beans.

The firſt and ſecond ſorts are to be planted in October and November, under warm walls and hedges, where, if they ſtand through the winter, they produce beans early in the ſpring. They may alſo be raiſed very cloſe in beds, and covered with hoops and matts in the winter; and in the ſpring planted out; but there is ſome hazard in the tranſplanting, and they will be a fortnight, or more, later than thoſe which have ſtood the winter abroad.

The Liſbon bean is preferred to the Spaniſh; and the curious ought to have freſh ſeed every two years from abroad, for they are apt to degenerate, though not in goodneſs, yet in their earlineſs.

The Spaniſh and Windſor beans are not to be planted till Chriſtmas, but eſpecially the Windſor, which are ſubject, more than any other kind, to be hurt by the cold. Theſe beans ſhould have an open ground, and be planted at the diſtance of two feet and a half, row from row, and four inches from one another in the rows; but if the place is cloſely ſurrounded with hedges and walls, the diſtance muſt be greater, elſe the ſtalks will run high, but they will bear very little fruit. The Sandwich beans are hardier than the Windſor, and may be planted to come in between the early crops and them; and, though not much regarded at preſent, they are a very good bean.

The firſt plantation of Windſor beans ſhould be made in the middle of January; and, after that, a new plantation ſhould be made every three weeks, till the middle of May, that there may be a ſucceſſion of crops. *Miller's Gard. Dict.*

Bean-Cod, a ſmall fiſhing veſſel amongſt the Portugueſe, generally navigated by one long ſail, the bottom of which ſtretches over the whole length of the deck, and the upper-part tapers to a point, ſo that it nearly reſembles a right-angled plain triangle. Theſe are called lateen-ſails.

Bean-Trefoil, in botany, a genus of plants with papilionaceous flowers, the vexillum of which is ſhorter than any of the other petals, and its fruit an oblong pod, containing kidney-like ſeeds. It may be added, that three leaves ſtand on every petal. Lemery ſays, that the leaves of bean-trefoil are laxative, and its ſeed emetic: but neither have obtained a place in our ſhops.

BEAR, *Urſa*, in zoology, a genus of quadrupeds, of the order of the *feræ*, or beaſts of prey; diſtinguiſhed by having only four teats, two on the breaſt, and two on the belly.

It is a large but unſightly animal, and of different ſizes in different countries.

Bear *Greater* and *Leſſer*, in aſtronomy; ſee the articles Ursa *Major* and *Minor*.

Bear's-Breech, in botany; ſee Acanthus.

BEARD *of a Comet*, in aſtronomy, the rays which the comet emits towards that part of the heavens whither it ſeems to direct its motion; and it is this that diſtinguiſhes the beard from the tail, which implies thoſe rays that are emitted in the tract through which it has paſſed.

Beard *of a Horſe*, that part underneath the lower jaw, between the chin and the place where the curb reſts.

Bearded *Huſk*, among floriſts, implies a huſk that appears hairy on the edges; as that of a roſe, &c.

BEARDING *of Wool*. See Wool.

BEARER, in architecture, a poſt, pier, or wall, erected between the two ends of a piece of timber, to ſhorten its bearing, or to prevent its whole weight reſting on the two ends only.

Bearer *of a Bill of Exchange*, the perſon in whoſe hands the bill is, or in favour of whom the laſt order was made. See Bill *of Exchange*.

BEARING, in navigation, an arch of the horizon, comprehended between the neareſt meridian and any diſtant object, either diſcovered by the eye, or found by the finical proportion; as, at four P.M. we diſcovered Cape Malacha, bearing W. 64°. S. or, having the difference of latitude and longitude given, we find the bearing and diſtance by analogy.

Bearing *of a piece of Timber*, among carpenters, ſignifies the ſpace either between its two fixed extremes, when it has no other ſupport, which they call bearing at length, or between one extreme and a poſt, brick-wall, &c. trimmed up between the ends to ſhorten its bearing.

Bearing *Claws*, among cock-fighters, are the foremoſt toes of a cock. If theſe are hurt or gravelled, he cannot fight.

BEAR-UP, or **Bear-Away**, in navigation, a ſhip is ſaid to do ſo when, having ſailed ſome time with a ſide-wind, ſhe alters her courſe and ſails more before it: this is probably called bearing-up, becauſe the helm is borne up to the wind-ſide of the ſhip; for, otherwiſe, it is not only abſurd, but an abſolute contradiction to ſay a ſhip bears-up when ſhe goes before the wind, ſince the direction of the wind, as well as the current of the tide in a river, is underſtood to determine the ſituation of places within its limits; for we always ſay, up to the wind-ward, and down to the lee-ward: and yet, abſurd and contradictory as it is to common ſenſe, this phraſe is adopted in the inſtruction of our navy, in the room of bear-away or bear-down.

BEAST, a general appellation for all four-footed animals, whether proper for food, labour, or ſport.

Beasts *of Burden*, all four-footed animals uſed in carrying burdens. Theſe are chiefly elephants, camels, dromedaries, horſes, mules, aſſes, and the ſheep of Mexico and Peru.

Beasts *of Chace*, are the buck, the doe, the fox, the roe, and the martin.

Beasts and **Fowls** *of the Warren*, are the hare, the coney, the pheaſant, and the partridge.

Beasts *of the Foreſt*, are the hart, the hind, the boar, and the wolf.

BEATIFICATION, an act whereby the pope declares a perſon beatified or bleſſed. It is the firſt ſtep towards canonization. See Canonization.

BEATING, or **Pulsation**, in medicine, the reciprocal motion or palpitation of the heart. See Pulse.

Beating *Flax* and *Hemp*. See Flax and Hemp.

Beating *Gold* and *Silver*. See Gold-Beating, &c.

Beating, in navigation, the act of making a progreſs againſt the wind, by tacking. See the article Tacking. Beating, however, is generally underſtood to be turning to windward in a ſtorm or freſh wind.

BEATS *of a Watch* or *Clock*, are the ſtrokes made by the fangs or pallets of the ſpindle of the balance, or of the pads in a royal pendulum. See Clock and Watch.

BEAVER, *Fiber*, in natural hiſtory, a creature about four feet in length, and twelve or fifteen inches broad. His ſkin, in the northern regions, is generally black, but it brightens into a reddiſh tincture in the temperate climates. He is covered with two ſorts of hair, one long, and the other a ſoft down; the latter, which is an inch in length, is extremely fine and compact, and accommodates the animal with a neceſſary warmth. The long hair preſerves the down from dirt and humidity.

The beaver, whether male or female, has four bags under his inteſtines, impregnated with a reſinous and liquid ſubſtance, which, when it is ejected, ſettles into a thick conſiſtence. See Castor.

His teeth are ſtrong, and deeply riveted into his jaws, with a long and crooked root; with theſe he cuts as well the wood with which he builds, as that which furniſhes him with food. His fore-feet reſemble thoſe of ſuch animals as hold what they eat with their paws, as apes, for inſtance, and rats, and ſquirrels; with theſe feet he digs, ſoftens, and works the clay, which is extremely ſerviceable to him. His hind feet are accommodated with membranes, or large ſkins, extending between his toes, like thoſe of ducks, and all other water-fowl; this makes it evident that the Author of nature intended the creature ſhould be amphibious. His tail is long, a little flat, entirely covered with ſcales, ſupplied with muſcles, and perpetually lubricated with oil or fat. This animal, who is an architect from his nativity, uſes his tail inſtead of a hod, for the conveyance of his clay or mortar, and a trowel to ſpread and form it into an incruſtation; the ſcales prevent theſe materials from penetrating the tail with their coldneſs and humidity: but would be injured by the air and water, were it not for the prevention of an oil, which he diſtributes all over them with his ſnout; the bags we have already mentioned are undoubtedly the magazines of this fluid. See plate XIV. *fig.* 6.

The beavers inhabit the ſame manſion in great numbers, unleſs violent heats, or inundations, the purſuits of hunters, ſcarcity of proviſions, or the extraordinary increaſe of their offspring, obliges them to ſeparate. In order to raiſe themſelves a convenient abode, they chuſe a ſituation that abounds with ſuſtenance, and is waſhed by a rivulet, and where they may form a convenient reſervoir of water for their habitation. They begin with building a mole or cauſey, in which the water may riſe to a level with the firſt ſtory.

This cauſey, at the foundation, may contain ten or a dozen feet in thickneſs; it deſcends in a ſlope on the ſide next the water, which, in proportion to its elevation, gravitates upon the work, and preſſes it with a ſtrong tendency towards the earth.

The oppoſite ſide is raiſed perpendicularly, like our walls; and the ſlope, which at its baſis is twelve feet broad, diminiſhes towards the top, whoſe breadth does not exceed two feet: the materials of this work are wood and clay. The beavers, with an admirable facility, cut the pieces of wood, ſome as thick as a man's arm, and others as large as the thigh, and from two to four, five, or ſix feet in length, and ſometimes more, in proportion to the aſcent of the ſlope. They drive the extremity of theſe, very near each other, into the earth, and take care to interlace them with other ſtakes, more ſlender and ſupple. But as the water, without ſome other prevention, would glide through the cavities, and leave the reſervoir dry, they have recourſe to clay, which they perfectly know how to procure, and with which they cloſe up all the interſtices, both within and without, and this entirely prevents all evacuation. They continue to raiſe the dyke proportionably to the water's elevation and plenty. They are likewiſe very ſenſible that their materials are not ſo eaſily tranſported by land as by water; and therefore take the opportunity of its increaſe to ſwim, with mortar placed on their tail, and ſtakes of wood between their teeth, to every place where they have occaſion for theſe materials. If the violence of the water, or the footſteps of hunters, who paſs over their work, damage it in any degree, they immediately repair the fracture, viſit all the edifice, and, with indefatigable application, refit and adjuſt whatever happens to be diſconcerted: but when they are too frequently perſecuted by the hunters, they only work in the night, or entirely diſcontinue their labours.

When the cauſey, or dyke, is compleated, they begin to form their cells, which are round, or oval apartments, divided into three partitions, raiſed one above another. The firſt is ſunk below the level of the dyke, and generally full of water; the other two are formed above it. They raiſe this ſtructure in a very ſolid manner, on the edge of their cauſey, and always in ſtories, that, in caſe the water ſhould aſcend, they may dwell in a higher ſituation. If they find any little iſland near the reſervoir, they fix their dwelling there, which is then more ſolid, and they are leſs incommoded with the water, in which they are capable of continuing but a ſhort time; but if they are not favoured with this advantage, they drive ſtakes into the earth with their teeth, to fortify the building againſt the winds and water. At the bottom they ſtrike the two openings to the ſtream; one conducts them to the place where they bathe, and which they always keep very decent; the other is a paſſage to that quarter, where they carry out every thing that would ſoil or rot the upper apartments. There is a third aperture much higher, calculated to prevent their being ſhut up, when the ice hath cloſed the openings into the lower lodgments. They ſometimes build their houſes entirely on dry land, and ſink ditches, five or ſix feet deep, in order to deſcend to the water. They employ the ſame materials and induſtry in the ſtructure of their dwellings, as they uſe for their cauſey. The walls of the building are perpendicular, and two feet thick. As their teeth are more ſerviceable than ſaws, they cut off all the projections from the wood that ſhoot out beyond the perpendicular of the wall; after which they work up a mixture of clay and dry graſs into a kind of mortar, with which, by the aid of their tails, they rough-caſt the out and inſides of the work.

The edifice is vaulted within, and generally riſes in an oval figure. The dimenſions are proportioned to the number of the intended inhabitants. Twelve feet in length, and ten in breadth, are ſufficient for eight or ten beavers. If the number increaſes, they enlarge the place accordingly. It has been aſſerted for a truth, that there have been found above an hundred of theſe creatures in different lodgments communicating with one another: but theſe populous ſocieties are very rare, becauſe they are too unmanageable and tumultuous, and the beavers are generally better acquainted with their own intereſt. They aſſociate to the number of ten or twelve, and ſometimes a few more.

There are ſome beavers, called terriers, who make their abode in caverns, dug in a riſing ground, either on the ſhore, or at ſome diſtance from the water, to which they ſcoop out ſubterraneous trenches from their caverns, which deſcend from ten to an hundred feet in depth. Theſe trenches furniſh them with retreats, ſituated at unequal heights, and wherein they enjoy a ſhelter from the water, when it riſes.

All theſe works, eſpecially in the cold regions, are compleated in Auguſt or September, after which period, they furniſh themſelves with proviſions. During the ſummer ſeaſon they regale themſelves with all the fruits and plants the country produces. In the winter, they eat the wood of the aſh, the plane, and other trees, which they ſteep in water, in quantities proportionable to their neceſſary conſumption; and they are ſupplied with a double ſtomach, to facilitate the digeſtion of ſuch a ſolid food at two operations. They cut twigs from thence to ſix feet in length; the large ones are conveyed by ſeveral beavers to the magazine, and the ſmaller by a ſingle animal; but they take different ways: each individual hath his walk aſſigned him, to prevent the labourers from being interrupted by their mutual occaſions. The dimenſions of their pile of timber are regulated in proportion to the number of the inhabitants; and it has been obſerved, that the proviſion of wood for ten beavers comprehended thirty feet in a ſquare ſurface, and ten in thickneſs. Theſe parcels of wood are not piled up in one continued heap, but laid acroſs one another, with interſtices between them, that they may the better draw out what quantity they want, and always take the parcel at the bottom which lies in the water. They cut this wood into ſmall pieces, and convey it to their cell, where the whole family comes to receive their particular ſhare.

Merchants diſtinguiſh three ſorts of beavers, though they are all the ſkins of the ſame animal: the new beaver, the dry beaver, and the coat beaver.

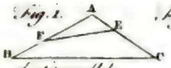
The new beaver, which is alſo called white beaver, or Muſcovy beaver, becauſe it is commonly kept to be ſent into Muſcovy, is that which the ſavages catch in their winter hunting. It is the beſt and the moſt proper for making fine furs, becauſe it has loſt none of its hair by ſhedding.

The dry beaver, which is ſometimes called lean beaver, comes from the ſummer hunting, which is the time when theſe animals loſe part of their hair.

Though this ſort of beaver be much inferior to the former, yet it may alſo be employed in furs; but it is chiefly uſed in the manufacture of hats. The French call it ſummer caſtor, or beaver.

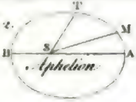
The coat beaver is that which has contracted a certain groſs and oily humour from the ſweat which exhales from the bodies of the ſavages who wear it for ſome time. Though this ſort be better than the dry beaver, yet it is uſed only in the making of hats.

Fig. 1.



Antiparallels

Fig. 2.



Aphelion

Fig. 6.

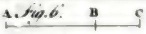
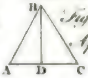
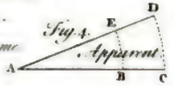


Fig. 3.



Apotome

Fig. 4.



Apparent

Apparent

Fig. 5.

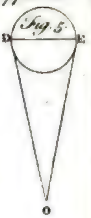
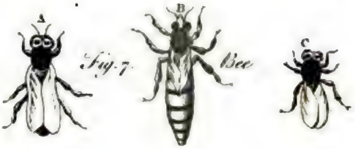


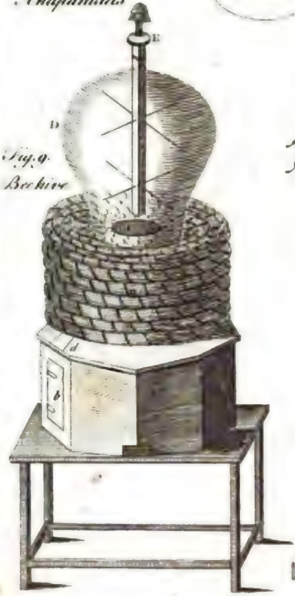
Fig. 7

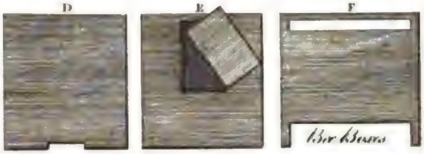


Bee

Fig. 9.

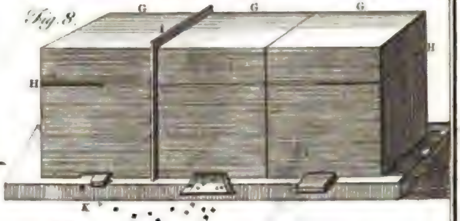
Beehive





Bee Boxes

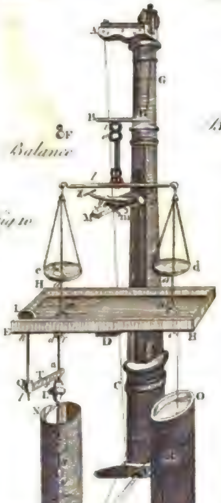
Fig. 8.



8F

Balance

Fig. 10.


A
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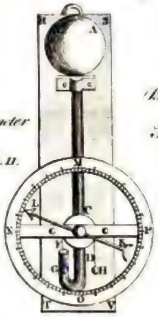
N
C
P

Barometer

Fig. 11.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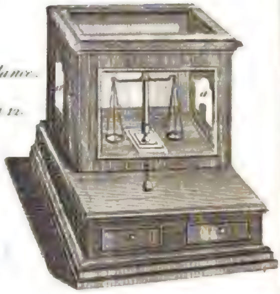
Balance.

Fig. 12.



The Butterfly.

Fig. 13.

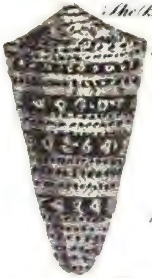
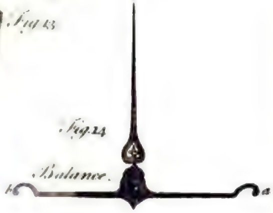


Fig. 14.

Balance.



Beſides hats and furs, in which the beaver's hair is commonly uſed, they attempted in France, in the year 1699, to make other manufactures with it; and accordingly they made cloths, flannels, ſtockings, &c. partly of beaver's hair, and partly of Segovia wool. This manufactory, which was ſet up at Paris, in St. Anthony's ſuburb, ſucceeded at firſt pretty well; and, according to the genius of the French, the novelty of the thing brought into ſome repute the ſtuffs, ſtockings, gloves, and cloth, made of beaver's hair: but they went out of faſhion of a ſudden, becauſe it was found, by experience, that they were of a very bad wear, and, beſides, that the colours faded very much: when they had been wet, they became dry and hard, like felt, which occaſioned the miſcarriage of the manufactory for that time.

When the hair has been cut off from the beaver's ſkin, to be uſed in the manufactory of hats, thoſe ſkins are ſtill employed by ſeveral workmen; namely, by the trunk-makers, to cover trunks and boxes; by the ſhoe-makers, to put into ſlippers; and by turners, to make ſieves for ſifting grain and ſeeds.

BEAUTY, a general term for whatever excites in us pleaſing ſenſations, or an idea of approbation.

We may therefore diſtinguiſh the notion annexed to beauty into ideas and ſenſations; the former of which poſſeſs the mind, the latter affect the heart. Thus an object may pleaſe the underſtanding, without intereſting the ſenſes; and, on the other hand, agreeable ſenſations may be excited by objects, whoſe ideas have no claim to our approbation.

In theſe diſtinctions the difficulty, or rather impoſſibility, of fixing a general characteriſtic of beauty conſiſts; becauſe the ideas and ſenſations of different perſons vary, according to their different turns of mind, and habitudes of body; and conſequently the relations of objects to thoſe ideas and ſenſations vary in the ſame manner. Hence ariſe the various opinions of beauty in women, painting, ſtatuary, &c.

Beauty, in architecture, painting, and other arts, is the harmony and juſtneſs of the whole compoſition taken together.

BECAH, or **Bekah**, in antiquity, a Jewiſh coin, worth nearly fourteen pence of our money.

BECALMING, in navigation. When the wind is interrupted in its paſſage to a veſſel by any contiguous body, as land, a high ſea behind, or another ſhip, it is called becalming her, as the ſails at that time remain in a ſtate of reſt, and are deprived of their governing power.

BECA-BUNGA, in botany, the ſame with anagallis. See Anagallis.

BECHICS, among phyſicians, medicines adapted to the cure of coughs.

The word is formed from the Greek, βηξ, βηχος, a cough.

BED *of the Carriage of a Cannon*, the thick plank that lies under the piece, and forming, as it were, the body of the carriage.

Bed, in maſonry, a courſe or range of ſtones.

Bed, in gardening, a ſquare or oblong piece of ground, raiſed a little above the level of the adjoining ground, and in which ſeeds are ſown, or plants ſet.

Hot **Bed**. See Hot-Bed.

Beds *of Minerals*, certain ſtrata or layers of matter diſpoſed over each other.

Lords of the **Bed-Chamber**, in the Britiſh cuſtoms, ten lords, who attend in their turns each week; during which time they lie in the king's bed-chamber, and wait upon him when he dines in private.

Bed-Moulding, in architecture, implies thoſe members of a cornice placed below the coronet. A bed-moulding at preſent conſiſts of an ogee, a liſt, a large *boltine*, and another liſt under the coronet.

BEE, in natural hiſtory, a ſmall inſect, famous for its induſtry.

With reſpect to form, the bee is divided by two ligaments, into three parts or portions, the head, the breaſt, and the belly. The head is armed with two jaws and a trunk, the former of which play like two taws, opening and ſhutting to the right and left. The trunk is long and taper, and extremely pliant and flexible, being deſtined by nature for the inſect to probe to the bottom of the flowers through all the impediments of their chives and foliage, and drain them of their treaſured ſweets: but were this trunk to be always extended, it would prove incommodious, and be liable to be injured by a thouſand accidents: it is therefore of ſuch a ſtructure, that, after the performance of its neceſſary functions, it may be contracted, or rather folded up; and beſides this, it is fortified againſt all injuries by four ſtrong ſcales, two of which cloſely ſheathe it, and the two others, whoſe cavities and dimenſions are larger, encompaſs the whole. From the middle part or breaſt of the bee grow the legs, which are ſix in number: and at the extremity of the paws are two little hooks, diſcernible by the microſcope, which appear like ſickles, with their points oppoſite to each other. The wings are four, two greater and two ſmaller, which not only ſerve to tranſport them through the air, but, by the noiſe they make, to give notice of their departure and arrival, and to animate them mutually to their ſeveral labours. The hairs with which the whole body is covered, are of ſingular uſe in retaining the ſmall duſt that falls from the chives of the flowers, of which the wax is formed, as will be obſerved hereafter. The belly of the bee conſiſts of ſix rings, which ſlide over one another, and may therefore be lengthened or contracted at pleaſure; and the inſide of this part of the body contains the inteſtines, the bag of honey, the bag of poiſon, and the ſting. The office of the inteſtines is the ſame as in other animals. The bag of honey is tranſparent as cryſtal, containing the ſweet juices extracted from flowers, which the bee diſcharges into the cells of the magazine for the ſupport of the community in winter. The bag of poiſon hangs at the root of the ſting, through the cavity of which, as through a pipe, the bee ejects ſome drops of this venomous liquor into the wound, and ſo renders the pain more exceſſive. The mechaniſm of the ſting is admirable, being compoſed of two darts, incloſed within a ſheath that tapers into a fine point, near which is an opening to let out the poiſon. The two darts are ejected through another aperture, which, being armed with ſeveral ſharp beards like thoſe of fiſh-hooks, are not eaſily drawn back again by the bee; and indeed ſhe never diſengages them if the wounded party happens to ſtart and put her into confuſion; but if one can have patience to continue calm and unmoved, ſhe clinches thoſe lateral points round the ſhaft of the dart, by which means ſhe recovers her weapon, and gives leſs pain to the perſon ſtung. The liquor which at the ſame time ſhe infuſes into the wound, cauſes a fermentation, attended with a ſwelling, which continues ſeveral days; but that may be prevented by immediately pulling out the ſting, and enlarging the puncture, to let the venomous matter have room to eſcape.

Let us now conſider the generation, polity, and labours of theſe inſects, the true knowledge of which is very much owing to the modern invention of glaſs-hives, through which all the ſecrets of the community are laid open to a curious obſerver. Any perſon who carefully examines a hive at different ſeaſons of the year, will diſtinguiſh three ſorts of bees; of which the far greater number are the common working bees, who do all the buſineſs of the hive, and ſeem to be neither male nor female. The working bee is repreſented at C (plate XV. *fig.* 7.) The ſecond ſort, called drones, are the males, are ſomewhat larger, (as A, *fig.* 7.) have no ſting, nor even ſtir from the hive, but live upon the honey prepared by the others. The third ſort is a much larger and longer bodied bee, of which there is often but one in a hive, at leaſt, but one in every ſwarm or colony of young bees, who are from time to time detached from the hive in ſearch of another habitation. This large bee is what the ancients called the king, from the reſpect they always ſaw paid to it by the other bees; but, being the female, the moderns more properly give it the title of queen, or mother of the ſwarm. See plate XV. *fig.* 7. B.

While the hive is ſufficient to contain the bees without inconvenience, the ſociety live peaceably together; but when their numbers are multiplied, ſo that their habitation is too ſmall, the young brood quit the place of their nativity, and fly in queſt of a new ſettlement. The ſwarm that goes out conſiſts of the common bees, under the conduct of one female or queen; or, if two queens come out of the ſame hive, then the body of common bees divides into two parts, each following one female: both parties, however, when they alight out of the air, uſually ſettle near each other on a branch of a tree; and then thoſe bees which form the ſmalleſt ſwarm go off, one by one, to the other cluſter, deſerting the queen they followed, who is at length murdered by her ſubjects. The ſwarm being thus united, and hanging down from the tree, the countryman, who is always vigilant on thoſe occaſions, provides for their accommodation a hive rubbed with balm, thyme, and other odoriferous herbs, into which he gently bruſhes them from the branch, and carries them to a ſtand prepared for that purpoſe. All this the bees bear very patiently, and, after they are a little compoſed, begin to think of forming themſelves convenient apartments in their new habitation.

When they begin this work, it is obſerved they divide themſelves into four parties, one of which is deſtined to the fields to provide materials for the ſtructure; the ſecond works upon thoſe materials, and forms them into a rough ſketch of the dimenſions and partitions of the cells; the third examines and adjuſts the angles, removes the ſuperfluous wax, poliſhes the work, and gives it its neceſſary perfection; and the fourth is employed in bringing proviſions to the labourers.

M. Maraldi takes notice that the bees employed in poliſhing the combs, work longer than thoſe that build them, becauſe poliſhing is not ſo laborious. They begin their work at the top of the hive, continuing downwards to the bottom, and from one ſide to another; and to make it the more ſolid they uſe a ſort of tempered wax, reſembling glue. The form of the cells of the honey-comb is hexagonal, which figure, beſides what is common with a ſquare and equilateral triangle, has the advantage of including a greater ſpace within the ſame ſurface. See the article COMB.

The expedition of the bees in their labour is almoſt incredible; for, notwithſtanding the elegance and juſt proportions of the work, they are ſo indefatigable, that they will, in one day, finiſh a honey-comb, a foot long, and ſix inches broad, capable of receiving three thouſand bees.

It is not eaſily to know, particularly, the manner in which they employ themſelves at this work, on account of the number of bees then in motion, by which means the eye can hardly diſtinguiſh any thing but confuſion. We have however been able to obſerve the following particulars: Some bees, bearing in each of their talons a little piece of wax, are ſeen running to the places where their companions are at work upon the combs; at their arrival they faſten the wax to the work by means of the ſame talons, which they apply ſometimes to the right, and ſometimes to the left. Each bee is employed but a ſhort time on this work, when another takes its place.

While a part of the bees are at work in conſtructing the cells, others are employed in perfecting thoſe that are newly modelled, finiſhing the angles, ſides, and baſes in ſo exquiſite a manner, and with ſuch remarkable delicacy, that three or four of theſe ſides laid upon one another, are not thicker than a leaf of common paper; and becauſe the entrance of the cell, which is adapted to the ſize of the bee, would, on account of this delicacy, be ſubject to break, they ſtrengthen the entrance of each cell with a border of wax.

We have already obſerved, that the bees which build the cells work but a little while at a time; but it is different with regard to thoſe that poliſh them, for they work a long while, and with great expedition, never intermitting their labour, unleſs it be to carry out of the cell the particles of wax taken off in the poliſhing: and, to prevent this wax from being loſt, other bees ſtand ready to receive it from the poliſhers, and carry it to ſome other part in order to its being employed.

Each comb has two rows of cells oppoſite to each other, which have their common baſes. The thickneſs of each comb is ſomething leſs than an inch; and, conſequently, the depth of each cell about five lines; but at the ſame time the breadth of each is little more than two.

All the combs are conſtructed with cells of this ſize, except a ſmall number of others in ſome particular parts of the hive, which are larger, and appropriated to the lodging eggs, that afterwards become drones, or male bees.

There are alſo, in ſome parts of the hive, three or four cells bigger than the others, and conſtructed in a different manner. They are of a ſpheroidical figure, open in the inferior part, and attached to the extremities of the combs.

When the cells are completed, the queen takes poſſeſſion of thoſe ſhe likes beſt to depoſite her eggs in, and the reſt are left to be filled with honey. She lays one egg in each cell, and ſometimes more than an hundred of thoſe eggs in a day; but what is ſtill more remarkable, ſhe lays thoſe eggs which are to produce common bees in cells of the common ſhape and ſize, thoſe that are to become drones or males, in the cells of a larger ſize, and depoſites thoſe which are to become females, like herſelf, in the ſpheroidical cells already deſcribed.

Theſe eggs, after lying ſome time in the cells, are hatched into maggots, and fed with honey for ten or twelve days, after which the other bees cloſe up the cells with a thin piece of wax; and under this covering they become gradually transformed into bees, in the ſame manner as ſilk-worms are into butterflies. Having undergone this change, the young bees pierce through their waxen doors, wipe off the humidity from their little wings, take their flight into the fields, rob the flowers of their ſweets, and are perfectly acquainted with every neceſſary circumſtance of their future conduct. As to the males or drones, which are deſtined only to propagate their ſpecies, they live very comfortably for about three months after they are hatched: but when that time is over, and the females are impregnated, the common bees either kill them, or drive them from the hive, as burdenſome to the community, and not a drone is to be found till the next ſeaſon.

The method in which the bees collect their wax and honey deſerves to be a little explained. At the bottom of all flowers there are certain glands which contain more or leſs honey, that is, the moſt exalted particles of the ſugary juices of the plant. Theſe juices the bee ſucks up with her proboſcis or trunk abovementioned, and draws it into its mouth; and when it has thus taken a ſufficient quantity into its ſtomach, it returns to the hive, and diſcharges the honey into the common magazine.

When the cells prepared to receive it are full, the bees cloſe up ſome with wax till they have occaſion for the honey; the reſt they leave open, to which all the members of the ſociety reſort, and take their repaſt with a very inſtructive moderation.

It is an excellent obſervation of a modern author, that the hive is a ſchool to which numbers of people ought to be ſent; prudence, induſtry, benevolence, public ſpiritedneſs, œconomy, neatneſs, and temperance, are all viſible among the bees. Theſe little animals are actuated by a ſocial ſpirit, which forms them into a body politic, intimately united, and perfectly happy. They all labour for the general advantage; they are all ſubmiſſive to the laws and regulations of the community: having no particular intereſt, no diſtinction but thoſe which nature or the neceſſities of their young have introduced amongſt them. We never ſee them diſſatisfied with their condition, or inclinable to abandon the hive in diſguſt, to find themſelves ſlaves or neceſſitous: on the contrary, they think themſelves in perfect freedom, and perfect affluence; and ſuch indeed is their real condition. They are free, becauſe they only depend on the laws; they are happy, becauſe the concurrence of their ſeveral labours inevitably produces abundance, which contributes to the riches of each individual. Let us compare human ſocieties with this, and they will appear altogether monſtrous. Neceſſity, reaſon, and philoſophy, have eſtabliſhed them for the commendable purpoſes of mutual aid and benefits: but a ſpirit of ſelfiſhneſs deſtroys all; and one half of mankind, to load themſelves with ſuperfluities, leave the other deſtitute of common neceſſaries.

Wax is compoſed of the farina, or duſt, formed on the apices of flowers. This the bees collect, and with their fore-feet and jaws, roll up into little balls, which they convey, one at a time, to the feet of their middle legs, and from thence to the middle joint of their hind legs, where there is a ſmall cavity like a ſpoon, to receive the burden. When thoſe bees, who are employed in collecting the wax, return to the hive, they are aſſiſted by their companions in diſcharging their load, who by little and little pick off the wax from their legs, and convey it to the common treaſure. With this they build their combs, obſerving a wonderful frugality, not the leaſt grain of it being waſted or neglected.

Conſidering the advantages ariſing from the labours of bees, is it not ſtrange that our country-people are not more ſollicitous about the preſervation and increaſe of theſe animals? It is certain they would multiply prodigiouſly with proper management; and we might, upon a moderate computation, have five thouſand times as much wax and honey produced in this kingdom as we have at preſent. Some attempts of this kind have already been made in our own country, and there is not the leaſt reaſon to doubt but they will, if purſued, be attended with ſucceſs. The firſt method we ſhall mention of this kind is that of the Rev. Mr. Stephen White, which he calls collateral bee-boxes; an invention by which part of the honey and wax may be taken without injuring the bees.

Manner of conſtructing a ſingle Bee-Box.—It may be made of deal, or any other boards, well ſeaſoned, that are not apt to warp or ſplit. The boards ſhould be near an inch thick: let it be eight inches and a half in height and breadth, every way, meaſuring within, and including the ſpace the thin boards take up at the ends, as if there were no ſuch boards: with theſe dimenſions it will contain about a peck and one pint. The box is in figure four ſquare. The front part muſt have a door cut in the middle of the bottom edge, about four inches wide, and half an inch in height, which will give free liberty to the bees to paſs through, yet not be large enough for their enemy, the mouſe, to enter. In the back part you muſt cut a hole with a rabbet in it, in which you are to fix a pane of the cleareſt and beſt crown-glaſs, about five inches in length, and three in breadth, and faſten it with putty. Let the top of the glaſs be placed as high as the roof within-ſide, that you may ſee the upper part of the combs, where the bees with their riches are moſtly placed. You will, by that means, be better able to judge of their ſtate and ſtrength, than if your glaſs was fixed in the middle. Such as are deſirous of ſeeing more of the bees works, may make the glaſs as large as the box will admit, without weakening it too much; which may be prevented by nailing a little ſlip of board croſs the bottom. The glaſs muſt be covered with a thin piece of board, by way of ſhutter, which may be made to hang over the glaſs, by a piece of tape going through the upper part of the ſhutter, and faſtened on the top of the box, by thruſting both ends into a gimlet hole; and after driving a peg pretty hard into the hole, you may cut off the peg cloſe to the box.

As for the two other ſides of the box, which, for diſtinction ſake, may be called the ends, they are not to be wholly encloſed. A ſpace is to be left in each end, near an inch wide at the top, and another ſpace more than an inch wide at the bottom; which ſpaces are to be extended in length, the whole breadth of the box. Through theſe, the bees are to have a communication from one box to another. To form theſe communications, a thin piece of ſlit deal muſt be let into the edges of the front and the back boards, ſo as to be fluſh with the edges of thoſe boards.

In the next place you are to provide a piece of ſlit deal, full half an inch thick, and large enough to cover one of the ends, but to be uſed indifferently, ſometimes at one end, and ſometimes at the other: for which reaſon it is not to be nailed, but tied on, in the following manner; viz. Take about three quarters of a yard of pretty ſtrong tape, which will be found better than packthread, becauſe it is leſs apt to relax and ſlacken. Fix one end of the tape in the front board, about ſix inches above the mouth, and directly over the middle of it. Let this end of the tape be faſtened in a gimlet-hole, with a peg drove hard in, and then cut off cloſe to the board, as was directed for the ſhutter. You are next to bore a hole on each ſide of your glaſs, ſix inches and a half from the bottom of the box: into each of theſe holes drive a peg; which may ſtand out more than an inch from the box. Let the pegs be made of aſh, which is a tough wood, and let one end of them be flat, that you may ſcrew them out or in the more conveniently. When this is done, take your looſe end-board, and ſet it in its proper place, ſo that it may cover one of the ends, it matters not which: then drawing your tape as tight as you can over it, faſten the end of it to one of the pegs by the ſide of the glaſs. This will confine your end-board, and keep the upper part of it cloſe to the box: and if the lower part ſhould gape a little, or ſtart from the box, you may keep it tight by a nail or two drove ſo gently into the ſtool, on which the box is placed, that you may, whenever you have occaſion, draw them out with your fingers; or, if you like it better, you may add another tape, with pegs as before, to go croſs the lower part of the end-board.

The gimlet holes need not be carried quite through the board, and it is better they ſhould not; for if any part of the ſtring appears within the box, it will give offence to the bees, and coſt them a great deal of pains to pull it to pieces.

You have now only to fix a ſtick, croſſing the box from end to end, about three inches from the bottom, to be a ſtay to the combs: and when you have painted the whole, to make it more durable, your box is finiſhed.

The judicious bee-maſter will here obſerve, that the form of the box is as plain as it is poſſible for it to be. It is little more than three ſquare pieces of board nailed together: ſo that a poor cottager, who has but ingenuity enough to ſaw a board into given dimenſions, to ſquare it exactly, and to drive a nail, may make his own boxes well enough, without the help or the expence of a carpenter. See plate XV. *fig.* 8. where D is the front of a ſingle box, E the back, and F the end.

Having thus conſtructed the boxes, it will in the next place be neceſſary to deſcribe the method of driving a ſwarm into them. In order to this, you are to take a box, with one end-board tied to it (as before directed) on your right hand, and another box, with the end-board tied to it on your left hand; ſet theſe together, leaving the communications open from one box to another: then tie the boxes together as faſt as you can, with a ſtring going five or ſix times round them. The boxes ſhould not be tied till you are juſt going to uſe them, becauſe the ſtring will grow ſlack with ſtanding, and then the boxes will be apt to ſlip one from the other, as you handle them.

Be careful to tie the ſhutters cloſe to the glaſs, that the light may not enter: for the bees ſeem to look upon the light as a hole or breach in their houſe, and, on that account, may not ſo well like their new habitation. But the principal thing to be obſerved, at this time, is to cover the boxes, as ſoon as ever the bees are hived, with a linen cloth thrown looſely over them; and it may be proper alſo to lay ſome green boughs upon them to protect them from the piercing heat of the ſun. Boxes will admit the heat much ſooner than ſtraw-hives; and if the bees find their houſe too hot, they will be wiſe enough to leave it. In all other reſpects, they are to be hived in boxes, after the ſame manner as in common hives, which being well known, no particular directions need be given concerning it.

When the bees are thus hived in two boxes, and placed in the evening where they are to remain, the ſtring which tied the two boxes together may be taken off, and the ſhutter of your glaſs being at liberty, obſerve which of the boxes the bees have made choice of for their preſent reſidence, and ſtop the mouth of that box with a ſlip of board, ſo that they may work only out of the empty box; for they will fill the former with their works before they begin in the latter. When you find they have begun in the ſecond box, it will be proper to give them a third, which is done in this manner. Take a thin knife, and cut through the reſinous ſubſtance, with which the bees will now have joined the end-board to the box; then looſening the tape that ties the board, thruſt gently a ſheet of double tin between the box and the end-board, taking away the latter, and placing an empty box in the room of it: this done, draw away the tin, with a gentle hand, and thruſt the new box cloſe to the other. You muſt alſo remember that the mouth of this third box muſt be ſtopped like the firſt, that the entrance may be only in the ſecond or middle box. See plate XV. *fig*. 8. where G, G, G, are three boxes joined together. H the tape which ties the end-boards, I the tin ſtopping the communication.

About the middle of Auguſt you will eaſily diſcover through your glaſſes, which of your colonies you may lay under contribution. Such as have filled three boxes will readily yield you one of them: and it will be beſt to take the box where there are feweſt bees, becauſe the queen-bee is not likely to be there. The moſt proper time is about three or four o'clock in the afternoon; when the operation may be eaſily performed in the following manner: Open the mouth of the box you are going to ſeize; or, which may be better, that half of it which is furtheſt from the middle box: then, with a thin knife, cut through the reſin with which the bees have joined this box to the middle one, till you find you have ſeparated them; after which thruſt your ſheet of tin gently between the boxes, and your work is done. The communication being thus ſtopped, the bees in the two boxes, where in all probability the queen is, will be a little diſturbed at the operation, but thoſe in the ſingle box will appear diſtracted. They ſoon become ſenſible that their ſovereign is not among them; and accordingly iſſue out at the new door in a viſible rage and diſorder: but this is quickly over; for they ſoon diſcover their companions, and fly to them with eager haſte, at the uſual mouth of the middle box, forgetting, in the midſt of their tranſports, the loſs of the riches they have left behind them. You may now carry off the prize without moleſtation, placing an end-board in the room of the box you have taken, drawing away your tin, and faſtening the board with tape, as before directed. See plate XV. *fig*. 8. where K repreſents the hole half open, and the bees iſſuing out of the box to be taken away.

By this method, large quantities of wax and honey may be collected, without deſtroying the bees, while your ſtock will be every year increaſed by ſwarms, and all your colonies well ſtocked with bees.

Another invention for ſaving the lives of bees, and increaſing the quantity of wax and honey, has very lately been laid before the ſociety for the encouragement of arts, &c. by Mr. Thorley, and obtained their approbation.

Deſcription of Mr. Thorley's **Bee-Hive**.—This ingenious and aſſiduous gentleman, having, from near ſixty years experience, found that his bee-hives would be productive of much greater profit to the owners of bees, and alſo render that cruel and ungenerous practice of deſtroying theſe animals not only unneceſſary, but pernicious, preſented a bee-hive of this conſtruction to the Society of Arts, &c. in the Strand, who readily purchaſed another of his hives filled with honey, &c. that they might be inſpected by the curious, and brought into univerſal uſe; and from this bee-hive the view on plate XV. *fig*. 9. was drawn. The Society, perſuaded that the invention would prove of the greateſt advantage to this country, have publiſhed a premium of two hundred pounds, in order to introduce either Mr. Thorley's, or ſome other method of a ſimilar kind, whereby much larger quantities of honey and wax might be procured, and, at the ſame time, the lives of theſe laborious and uſeful inſects preſerved.

The bottom part, marked A, is an octangular bee-box, made of deal boards, about an inch in thickneſs, the cover of which is about 17 inches in diameter, but the internal part only 15 ½, and its height ten inches. In the middle of the cover of this octangular box is a hole, which may be opened or ſhut at pleaſure, by means of a ſlider *d*. In one of the pannels is a pane of glaſs, covered with a wooden door, *b*. The entrance, *a*, at the bottom of the box is about three inches and a half broad, and half an inch high. Two ſlips of deal, about half an inch ſquare, croſs each other in the center of the box, and are faſtened to the pannels by means of ſmall ſcrews. To theſe ſlips the bees faſten their combs.

In this octangular box the bees are hived, after ſwarming in the uſual manner, and there ſuffered to continue till they have built their combs, and filled them with honey, which may be known from opening the door, and viewing their works through the glaſs pane, or by the weight of the hive. When the bee-maſter finds his laborious inſects have filled their habitation, he is to place a common bee-hive of ſtraw, repreſented at B, made either flat at the top, or in the common form, on the octangular box, and draw out the ſlider, by which a communication will be opened between the box and the ſtraw hive; the conſequence of which will be, that thoſe laborious inſects will fill this hive alſo with the product of their labours. When the bee-maſter finds the ſtraw hive is well filled, he may puſh in the ſlider, and take it away, placing another immediately in its room, and then drawing out the ſlider. Theſe indefatigable creatures will then fill the new hive in the ſame manner. By proceeding in this method, Mr. Thorley aſſured the Society that he had taken three ſucceſſive hives, filled with honey and wax, from one ſingle hive, during the ſame ſummer; and that after he had laid his inſects under ſo large a contribution, the food ſtill remaining in the octangular box, was abundantly ſufficient for their ſupport during the winter. He added, that if this method was purſued in every part of the kingdom, inſtead of that cruel method of putting the creatures to death, he was perſuaded from long experience, that wax would be collected in ſuch plenty that candles might be made with it, and ſold as cheap as thoſe of tallow are at preſent.

Mr. Thorley has alſo added another part to his bee-hive, which cannot fail of affording the higheſt entertainment to a curious and inquiſitive mind. It conſiſts of a glaſs receiver, repreſented at D, 18 inches in height, 8 inches in diameter at the bottom, and in the greateſt part 13. This receiver has a hole at the top, about an inch in diameter, through which a ſquare piece of deal E is extended to nearly the bottom of the veſſel, having two croſs bars to which the bees faſten their combs. When the bees have filled their ſtraw hive, (which muſt have a hole in the center C, covered with a piece of tin) Mr. Thorley places the glaſs-receiver upon the top of the ſtraw hive, and draws out the piece of tin: the bees, now finding their habitation enlarged, purſue their labours with ſuch alacrity, that they fill this glaſs hive likewiſe with their ſtores. And as this receptacle is wholly tranſparent, the curious obſerver may entertain himſelf with viewing the whole progreſs of their works. One of the hives, now depoſited at the Society's rooms in the Strand, is filled with the produce of the labours of thoſe inſects; and the glaſs-hive is ſuppoſed to contain near thirty pounds of honey. See a further account of managing theſe uſeful creatures, and the nature of their productions, under the articles Swarm, Hive, Honey, Wax, &c.

Bee-Bread, a ſubſtance found in the cells of bees, and which is thought neceſſary to their ſubſiſtence. It is nothing more than wax itſelf unprepared.

BEECH, *Fagus*, a large and beautiful tree, whoſe leaves ſomewhat reſemble thoſe of the horn-beam: the male flowers grow together in a round bunch, and are produced at remote diſtances from the fruit on the ſame tree: the fruit conſiſts of two or three triangular nuts, which are incloſed in a rough hairy rind, divided into four parts.

There is but one ſpecies of this tree at preſent known (except the two varieties with ſtriped leaves, which are accidental), though the planters would diſtinguiſh two or three ſorts; one of which they call the Mountain beech; and, as they ſay, affords a much whiter timber than the other, which they call the wild beech: but as thoſe have never been diſtinguiſhed by the botaniſts, and as no real difference can be perceived amongſt all the trees of this kind yet ſeen, it is probable the difference in the colour of the wood is occaſioned by the place of their growth; which is often obſerved to be the caſe with moſt other ſorts of timber.

This tree is propagated by ſowing the maſt; the ſeaſon for which is any time from October to February; only obſerving to ſecure the ſeeds from vermin, when early ſowed; which, if carefully done, the ſooner they are ſown the better, after they are fully ripe: a ſmall ſpot of ground will be ſufficient to raiſe a great number of thoſe trees from the ſeeds; but you muſt be very careful to keep them clear from weeds; and if the plants come up very thick, you ſhould not fail to draw out the ſtrongeſt of them the autumn following, that thoſe left may have room to grow: ſo that, if you huſband a ſeed-bed carefully, it will afford a three years draught of young plants, which ſhould be planted in a nurſery; and if deſigned for timber-trees, at three feet diſtance row from row; and eighteen inches aſunder in the rows.

But if they are deſigned for hedges (to which the tree is very well adapted), the diſtance need not be ſo great; two feet, row from row, and one foot in the rows will be ſufficient. In this nurſery they may remain two or three years, obſerving to clear them from weeds, as alſo to dig up the ground between their roots, at leaſt once a year, that their tender roots may the better extend themſelves each way; but be careful not to cut or bruiſe their roots, which is injurious to all young trees; and never dig the ground in ſummer, when the earth is hot and dry; which, by letting in the rays of the ſun to the roots, is often the deſtruction of the young trees.

Beech-Mast, the fruit of the beech-tree, excellent for the fattening of hogs, &c.

BEER, a common and well known liquor, made with malt and hops, and uſed in thoſe parts of Europe where vines will not grow, and where cyder is ſcarce. See the articles Malt, Brewing, &c.

It is chiefly diſtinguiſhed from ale by the quantity of hops, which is greater in beer, and thereby renders the liquor bitterer, and fitter to keep.

There are various differences in beers, proceeding from the ways of brewing, from the different countries or climates, from the water that is uſed, from the time ſpent about them, from the ingredients made uſe of, and the proportions of theſe ingredients.

That beer is reckoned the beſt which is clear, and of a pale colour, of a pungent and agreeable taſte, that ſparkles upon being poured into a glaſs, and is neither too old nor too new.

Aigre **Beer** is uſed by callico-printers, chemiſts, lapidaries, ſcarlet-dyers, vinegar merchants, and white-lead men.

Bottling of **Beer** is beſt performed in this manner: firſt, take clear water, or ſuch as has been well impregnated with the eſſence of ſome herb; to every quart of which add half a pound of ſugar. Afterwards, having cauſed this water to be gently boiled and ſcummed, add a few cloves: let it cool in order to have barm or yeaſt put to it, and being brought to work, take off the ſcum again: that done, while it is in a ſmiling condition, put three ſpoonfuls into each bottle, which is to be filled up with beer, and ſecurely corked. A few cryſtals of tartar do alſo very well in bottled beer; eſpecially if a few drops of the eſſence of barley, wine, or ſome eſſential ſpirits be added.

Beer, among weavers, a term that ſignifies nineteen ends of yarn, running all together the whole length of the cloth.

Beer-Measure. See Measure.

BEESTINGS, a term uſed by country people for the firſt milk taken from a cow after calving.

BEET, *Beta*, in botany, a plant with large, ſmooth, broad-ribbed, juicy leaves; and ſlender, ſtriated, branched ſtalks, bearing ſpikes of imperfect flowers ſtanding in five-leaved cups, followed each by a roundiſh, rough, watery ſeed-veſſel. Different ſorts of this plant are cultivated in our culinary gardens; a whitiſh-leaved called *ſicula* or *cicla*, a green-leaved, and a reddiſh-leaved, all with long thick white roots; and a long-rooted, and a turnip-rooted, all over red. They are all biennial.

The red ſorts give out their colour along with their aqueous juice upon expreſſion; and by infuſion tinge rectified ſpirit, as well as water, of a deep red. The juice, both of the roots and the leaves of the red and white beets, ſnuffed up the noſe, proves a powerful errhine, occaſioning a copious diſcharge of mucus, without provoking ſneezing.

The roots of the beets have, when dry, an agreeable ſweetiſh taſte, which is totally extracted by boiling in rectified ſpirit: the tinctures on ſtanding ſome weeks in a cool place, depoſite whitiſh ſaline concretions, of a ſaccharine ſweetneſs. Mr. Marggraf obſerves, that the red beet loſes in drying ſeven eighths of its weight; and the white ſix eighths; that the dry red beet yields nearly one twenty-ſixth its weight of the ſaccharine ſalt, and the white ſort one ſixteenth; and that a good ſugar is obtainable from the juice of the freſh roots, by the method practiſed abroad for preparing it from the ſugar-cane.

All kinds of beet, whether white or red, ſhould be ſown in March, in a deep and light ſoil. The former is cultivated for its leaves, and the latter is eſteemed for its root, which, when boiled, cold, and cut into thin ſlices, makes a grateful mixture with winter ſallads. The reddeſt and largeſt roots are the tendereſt and moſt eſteemed: conſequently the principles of the new huſbandry are extremely applicable to this plant; and we have accordingly been told that M. de Chateauvieux had beet roots, managed this way, which meaſured from five to ſixteen inches in diameter towards their top, or thickeſt part, though raiſed in a common field, and cultivated only with the horſe hoe.

Their uſual culture in the garden is to hoe the ground carefully when the plants have put out four leaves, to cut up all weeds, and to thin the plants till they ſtand ten or twelve inches aſunder. In three weeks or a month more, the hoeing and weeding ſhould be repeated; and in ſix weeks after this, the ground ſhould be hoed over a third time, and the plants of the red beet, of which we now ſpeak, ſhould be thinned again till they are eighteen inches from each other, if it be intended that they ſhould grow to the largeſt ſize. This is generally the laſt hoeing beſtowed upon them: for their leaves, which are then large, ſoon ſpread ſo as to cover the whole ground, and effectually keep under any weeds that may afterwards ſpring up. Theſe leaves are moſt commonly of a deep green, or purple colour.

Inſtead of this method of cultivating beet, we are ſufficiently warranted by M. de Chateauvieux's ſucceſs, to recommend ſowing them in rows, in which they ſhould ſtand fourteen or fifteen inches aſunder in the row, and, inſtead of the hoeings beforementioned, to dig the ground between the rows at leaſt a ſpade deep, as often as weeds appear, or in proportion to the greater dryneſs of the weather; for, though it may ſeem a paradox to ſome of our readers, every inſtance of M. de Chateauvieux's practice proves, that, even in the greateſt droughts, each ſtirring of the earth with the horſe-hoe gave freſh vigour to the plants.

The beet roots will be fit for uſe in autumn, and will continue good all the winter; but they will begin to grow hard and ſtringy in the ſpring, when they will begin to ſhoot. The ſeeds of this plant, by which only it is propagated, ripen about the end of Auguſt, or in the beginning of September. They are round, rough, and about the bigneſs of a middling pea. To obtain them in perfection, ſome of the fineſt roots that have been preſerved from the winter's froſts are replanted in March, and let run up to ſeed. The kitchen-gardeners about London, in order to ſave ground, frequently ſow the red beet with carrots, parſnips, or onions, and afterwards draw up their carrots and onions when they are young, to make room for the growth of the beet: but, unleſs they pull them up very young indeed, it is much better to ſow the beet ſeparately.

BEETLE, *Scarabæus*, in the hiſtory of inſects. See the article Scarabæus.

Beetle alſo denotes a wooden inſtrument for driving piles, &c.

It is likewiſe called a ſtamper; and by paviors a rammer.

BEGHARDI, *Beguardi*, a certain ſect of heretics, which aroſe in Germany, and in the Low-countries, about the end of the thirteenth century. They made profeſſion of monaſtical life, without obſerving celibacy; and maintained, if they are not ſcandalized by the monks, that man could become as perfect in this life as he ſhall be in heaven; that every intellectual nature is of itſelf happy, without the ſuccour of grace; and that he who is in this ſtate of perfection ought to perform no good works, nor worſhip the hoſt.

BEGLERBEG, a governor of one of the principal governments in the Turkiſh empire. There are two ſorts of beglerbegs; the one have a certain revenue aſſigned upon the cities, boroughs, and villages of their government,

vernment, which they raiſe by power of the commiſſion granted to them by the ſultan; the others have a certain rent paid by the treaſurer of the grand ſeignior. They are become almoſt independent, and have under their juriſdiction ſeveral ſangiacs, or particular governments, and beys, agas, and other officers who obey them.

BEGUINS, congregations of devout young women, who maintain themſelves by the work of their hands, leading a middle kind of life between the ſecular and religious. Theſe ſocieties conſiſt of ſeveral houſes placed together in one incloſure, with one or more churches, according to the number of beguins.

There is in every houſe a prioreſs, without whoſe leave they cannot ſtir out. Their vow is conceived in theſe terms: "I promiſe to be obedient and chaſte, as long as "I continue in this beguinage." They obſerve a three years noviciate, before they take the habit, and the rector of the pariſh is the ſuperior, but can do nothing without the advice of eight beguins.

They are eſtabliſhed in ſeveral parts of Flanders.

BEHEN, in pharmacy, a name appropriated to two roots, very different from one another in ſhape, colour, and their whole external appearance, and diſtinguiſhed by the names of white and red behen.

We have them both from the Levant, and they ſeem to be produced in many parts of the Eaſt; but no where in ſuch plenty as about the foot of Mount Lebanon.

The ſame virtues are attributed to both kinds of behen, but the white is ſuppoſed to poſſeſs them in the greateſt degree; they are ſaid to be great cordials and reſtoratives, and to be good in nervous complaints.

BEIRAM, or BAIRAM, a Turkiſh word which ſignifies a ſolemn feaſt. The Turks celebrate two beirams: the greater, which falls on the tenth day of the laſt month of the Arabic year, which is the month of pilgrimage; and the leſſer, which ends the feaſt of the month Rammadan, and falls on the firſt day of the month Scheval. This latter is celebrated at Conſtantinople, and elſewhere, with great rejoicings, becauſe it puts an end to their faſting; and for this reaſon it is vulgarly called the Eaſter of the Turks.

During theſe feaſts the people leave their work for three days. The latter beiram begins upon the firſt appearance of the next new moon after the month Rammadan. If the clouds hinder the ſeeing this planet, they ſtay a day or two: but if the air continues dark and cloudy for ſeveral days together, they begin their feaſt though they have not ſeen the moon. The beiram is publiſhed at Conſtantinople, by diſcharging three great cannon that are upon the top of the ſeraglio next the ſea-ſide; and then the drums are beaten, and the trumpets ſounded, in all the public places of the city, and at the great men's houſes. All the chief officers of ſtate that are at Conſtantinople aſſemble in the ſeraglio, to pay their compliments to the grand ſeignior. There they are entertained at a magnificent dinner, and ſixteen veſts, lined with ſables, preſented to ſixteen of the principal of them. After this come the ſultaneſſes of the old ſeraglio, who are permitted to ſhare in the mirth and feaſtings of thoſe of the great ſeraglio, during the three days celebration of the beiram.

BEL, or BELUS, the ſupreme god of the ancient Chaldeans or Babylonians. He was the founder of the Babylonian empire, and is ſuppoſed to be the Nimrod of Scripture, and the ſame as the Phœnician Baal.

This god had a temple erected to him in the city of Babylon, on the very uppermoſt range of the famous tower of Babel, or Babylon, wherein were many ſtatues of this deity, and one, among the reſt, of maſſy gold, forty feet high. The whole furniture of this magnificent temple was of the ſame metal, and valued at eight hundred talents of gold.

This temple, with its riches, was in being till the time of Xerxes, who, returning from his unfortunate expedition into Egypt, demoliſhed it, and carried off the immenſe wealth contained in it.

It was the ſtatue of this god which Nebuchadnezzar, being returned to Babylon, after the end of the Jewiſh war, ſet up, and dedicated in the plain of Dura; the ſtory of which is related at large in the third chapter of Daniel.

BEL *and the* DRAGON, the hiſtory of, An apocryphal, and uncanonical, book of Scripture. It was always rejected by the Jewiſh church, and is extant neither in the Hebrew nor the Chaldee language; nor is there any proof that it ever was ſo. St. Jerom gives it no better title than the Fable of Bel and the Dragon. It is however permitted to be read, as well as the other apocryphal writings, for the inſtruction and improvement of manners.

BELATUCADRUS, or BELLOTUCADRUS, a deity of the ancient Britons, particularly the Brigantes, or inhabitants of Cumberland.

He appears to have been the ſame as Mars; and it is probable the name might be taken from Bel, or Baal, the great idol of the Aſſyrians, which, according to Cedrenus, was the ſame as Mars.

BELAYING, amongſt ſeamen, faſtening a ſmall rope; as there are other phraſes appropriated to larger ropes, as bend, bit, ſtopper, &c.

BELEMNITES, in natural hiſtory, a kind of foſſil ſubſtance, with regard to whoſe origin naturaliſts are divided. It is generally called the thunder-bolt.

The word is formed from the Greek, βελεμνον, a dart.

Luyd takes the belemnites to be the fiſh called narhwal petrified, or a concretion formed in ſhape of the pennicella marina. Helwing will have it to be a ſea plant, and Woodward a mineral production of the earth. Lang, in his hiſtory of the ſtones of Switzerland, thinks it to be a ſort of ſtalactites or foſſile pipe, formed by flowers. Wolkman, in his Subterranean Sileſia, conſiders it as the thorns of the back of ſome animal; and Ehrard, in his Diſſertation on the Belemnites, ſays it is the covering of the cells of a ſhell fiſh, of the ſame genus with the nautilus or ammon's horn; though inſtead of being ſpiral, it is ſtraight. Bourquet maintains they are the teeth of a crocodile or ſome ſort of whale; and Buttner places them among the foreign foſſils. Klein ſays it is the prickle of a ſort of hedge-hog; and Linnæus refers it to the claſs of ſhells with ſeveral cells.

The ſhape of the belemnites is ſometimes conical, ſometimes cylindrical, and commonly conſiſts of a black and horny ſubſtance. The inward parts conſiſt of rays, and there is generally a cell at the large end, and a furrow that runs from the top to the bottom. Dr. Plott informs us that, when the belemnitæ are rubbed againſt each other, or are ſcraped with a knife, they have the ſmell of raſped horn, and that their texture conſiſts of ſmall threads running like rays from the centre, or rather from the axis of the ſtone to the ſurface: when burned they have likewiſe a ſmell like that of horn; and the greateſt he found was ſomewhat above four inches in length, and about an inch and a quarter in thickneſs.

They are found in all ſorts of ſtrata, in clay, gravel, beds of ſtone, and often in looſe flints. They are ſometimes found covered with a ſparry cruſt of a different texture from the body of the maſs.

BELENUS, the tutelar deity of the ancient inhabitants of Aquileia in Italy, of the Gauls, and of the Illyrians. He was the ſame as Apollo, or the Sun; as we learn from Julius Capitolinus, who relates, that when Maximinius in vain beſieged Aquileia, he ſent ambaſſadors into the town, who had almoſt perſuaded the people to ſurrender, had not Menophilus and his colleague oppoſed it, telling them, that the god Belenus had promiſed them the victory over Maximinius. The hiſtorian adds, that the ſoldiers of Maximinius afterwards gave out, that Apollo fought againſt them.

BELIEF, in a general and natural ſenſe, ſignifies a perſuaſion or ſtrong aſſent of the mind to any propoſition; but, in a more reſtrained and technical ſenſe, it imports that kind of aſſent which is founded on the authority or teſtimony of ſome perſons atteſting the truth of any matter propoſed.

BELIEF is generally diſtinguiſhed into divine and human, not with regard to the propoſition believed, but with regard to the teſtimony on which we believe it. When God reveals any thing to us, this gives us the teſtimony of divine belief. See the article FAITH.

But what man only acquaints us with, produces only a human belief. See the article EVIDENCE.

BELL, a well known machine, ranked by muſicians among the muſical inſtruments of percuſſion.

The metal of which a bell is made, is a compoſition of tin and copper, or pewter and copper: the proportion one to the other is about twenty pounds of pewter, or twenty-three pounds of tin, to one hundred weight of copper.

Bell-metal is prohibited to be imported, as are hawk-bells, &c.

The conſtituent parts of a bell are the body or barrel, the clapper on the inſide, and the ear or cannon on which it hangs to a large beam of wood.

The ſound of a bell conſiſts in a vibratory motion of its parts, much like that of a muſical chord. The ſtroke of the clapper muſt neceſſarily change the figure of the bell, and of a round make it oval; but the metal having a great degree of elaſticity, that part will return back again which the ſtroke drove fartheſt off from the center, and that even ſome ſmall matter nearer the center than before; ſo that the two parts which before were extremes of the longeſt diameter, do then become thoſe of the ſhorteſt: and thus the external ſurface of the bell undergoes alternate changes of figure, and by that means gives that tremulous motion to the air in which the ſound conſiſts.

The uſe of bells was not known in the Eaſtern church till the year 865, when Urſus Patriſiacus, duke of Venice, made a preſent of ſome to Michael, the Greek emperor, who firſt built a tower to the church of Sancta Sophia, to hang them in. Who firſt brought bells into uſe in the Latin church, is a thing not yet determined; ſome aſcribing them to pope Sabinianus, ſucceſſor of St. Gregory, in the year 604; and others to Paulinus, biſhop of Nola, cotemporary with St. Jerom: but the latter opinion ſeems to be a vulgar error, and to have no better foundation than Paulinus's being biſhop of Nola in Campania, where it is pretended bells were firſt invented, and thence called Nolæ and Campanæ. Cardinal Bona would have it thought, that they began to be uſed in the Latin church immediately upon the converſion of the emperors to Chriſtianity, becauſe the tintinnabula, or leſſer ſort of bells, had been uſed before by the heathens to the like purpoſe: but there is no ancient author that countenances his conjecture.

Diving BELL. See the article DIVING.

BELL-FOUNDERY. See FOUNDERY.

BELL-FLOWER, *Campanula*, in botany; ſee the article CAMPANULA.

BELL-WEED, *jacea nigra*, in botany; ſee the article JACEA.

BELLA-DONNA, in botany, a genus of the pentandria-monogynia claſs of plants, called by Linnæus atropa.

The flower conſiſts of a ſingle infundibuliform petal, divided into five ſegments at the mouth; and its fruit is a bilocular globoſe berry, containing a number of kidney-ſhaped ſeeds.

BELLING *of Hops* denotes their opening and expanding themſelves. See HOPS.

BELLIS, DAISY, in botany, a genus of plants, the compound flower of which is radiated, and the particular hermaphrodite one of a funnel ſhape, and has no other pericarpium than the cup.

Culture produces a great number of variations in the colour and duplicature of the flower, all of which have been deſcribed by authors as different ſpecies; whence this plant has been divided into almoſt fifty. The ſeeds are obverſely oval in their figure.

There are two ſpecies of this plant uſed in medicine, diſtinguiſhed by the epithets major and minor.

BELLIS *Major*, greater or oxeye daiſy; a plant with oblong narrow deeply indented leaves, joined cloſe to the ſtalks, which are pentagonal, hairy, branched, and bear on the tops pretty large ſolitary flowers, compoſed of white petala ſet round a yellow diſk. It is perennial, grows wild in corn and paſture grounds, and flowers in May and June.

The leaves of this plant have been recommended in diſorders of the breaſt, both aſthmatical and phthiſical, and as diuretics. Geoffroy relates, that the herb, gathered before the flowers have come forth, and boiled in water, imparts an acrid taſte, penetrating and ſubtile like pepper; and that this decoction is an excellent diuretic and vulnerary. Either this experiment was made, not with the bellis major, but with the bellis minor, or elſe the herb loſes its pungency when the flowers appear; the bellis minor is manifeſtly acrid, but in the major, when in flower, no acrimony could be obſerved: the leaves, whilſt freſh, ſeemed little other than herbaceous; when dried, they diſcovered to the palate a not ungrateful mucilaginous ſweetneſs.

BELLIS *Minor*, common daiſy, a low ſomewhat hairy plant, with oblong leaves lying on the ground, widening from the root to the extremity, which is rounded: among theſe ariſe round ſlender naked perticles, bearing ſolitary flowers compoſed of white or purpliſh petala ſet round a yellow diſk. It is perennial, common almoſt every where, and flowers early in ſpring.

This plant ſtands recommended as a vulnerary, detergent, and reſolvent, in diſeaſes of the breaſt, internal bruiſes, hypochondriacal complaints, and diſorders proceeding from the drinking of cold liquors when the body has been much heated. Schrœder informs us, that the leaves and flowers looſen the belly.

The leaves, which have been chiefly made uſe of, are in taſte ſlightly acrid. The roots are conſiderably ſtronger, of a ſubtile penetrating pungency, not hot or fiery, but ſomewhat of the contrayerva kind; and, though at preſent diſregarded, promiſe to be a medicine of no ſmall virtue. Their pungent matter is not diſſipated in drying, is diſſolved both by water and ſpirit; and on inſpiſſating the ſolutions is left in great part behind, in the watery, as well as in the ſpirituous extract. No part of the plant has any remarkable ſmell. *Lewis's Hiſtory of the Materia Medica.*

BELLON, a diſtemper common in countries where they ſmelt lead ore; as alſo among plumbers and painters.

It is attended with languor, intolerable pains and ſenſation of gripings in the belly, and generally coſtiveneſs.

Beaſts, poultry, &c. as well as men, are ſubject to this diſorder: hence a certain ſpace round the ſmelting-houſes is called bellon-ground, becauſe it is dangerous for an animal to feed upon it.

The cure of this diſeaſe depends principally on cleanſing the primæ viæ, or the firſt paſſages: and therefore, after bleeding ſuch patients, if they are plethoric, a vomit of emetic wine or tartar ſhould be given; which muſt be a doſe double to what would vomit another perſon, otherwiſe it will have no effect, eſpecially when the diſeaſe is violent, or has continued long. Half a dram of vitrum antimonii has been given for one doſe; and warm water drank plentifully during its operation. If the vomit operates well, and alſo purges briſkly, the patient is in a fair way of recovery; which a ſecond, but milder, doſe of ipecacuanha, with ſome tartar emetic mixed, often makes compleat: but if the emetic neither vomits nor purges, the patient is generally worſe for it; and a ſtronger doſe ſhould be given ſoon. If it vomits but does not purge, a cathartic of the antimonial kind, or of jallap and mercury, in greater than ordinary quantities, ought to be given: and during the time of purging by the emetic or cathartic medicine, the patient ought to drink warm broth plentifully. The vomits and purgatives ought to be repeated at proper intervals, till the uneaſineſs in the ſtomach and guts from the diſeaſe is gone.—If theſe medicines operate too roughly, an opiate may be given at night; but this is to be adminiſtered ſparingly, leſt it bring on or increaſe coſtiveneſs, which is the worſt thing that can attend the patient. At the ſame time, emollient, anodyne, and laxative clyſters, are frequently to be injected for emptying the inteſtines, if the purgatives do not perform their duty.

When blood or matter are paſſed with the fæces, the emetics and purgatives are to be diſcontinued. The hot bath is alſo of the utmoſt ſervice in this terrible diſeaſe, and ſeems indeed to be the laſt reſource.

BELLONA, the pagan goddeſs of war. She is joined by Homer with Mars, the god of war.

Bellona is called by the Greeks 'Ενυω, Enyo. Some make her the mother, others the ſiſter, and others ife of Mars, who is ſtiled Enyalius upon one or other ofe accounts. Heſiod ſays, ſhe was the daughter orcys and Ceto.

the ſun, among other names, is ſuppoſed to have worſhipped under that of Mars, ſo it is probable ona repreſented the moon. This deity had a temple ome, near the Circus Flaminius, before which ſtood column of war, from whence the conſul threw his e, when he declared war againſt any king or nation. as founded by Appius Claudius the blind, who was ſul in the year of Rome 457.

ellona was particularly worſhipped at Comana, a city Cappadocia. It was thought that Oreſtes and his r Iphigenia brought this religion from Tauric Scy- a, and that it was the ſame kind of worſhip as was re paid to Diana Tauropolos. The temple of this ddeſs in that city was ſerved by a great number of eſts, under the authority of a pontiff, who was next in gnity to the king.

Cambden remarks, that there was in the city of York temple of Bellona, in the time of the emperor Severus: Spartian, ſpeaking of that city, relates, that Severus, ming thither, and intending to offer ſacrifice, was con- cted to the temple of Bellona by the miſtake of an ig- orant augur.

BELLONARII, in Roman antiquity, the prieſts of ellona, who, in honour of that goddeſs, uſed to make ciſions in their body; and, after having gathered the lood in the palm of their hand, gave it to thoſe who ere partakers of their myſteries.

BELLONIA, in botany, a genus of plants, whoſe lower, conſiſting of a ſingle petal, is of the rotated kind; he fruit is a capſule of a turbinato-oval figure, ſurrounded by the cup, and containing only the cell, in which are numerous very ſmall roundiſh ſeeds.

BELLOWING, among ſportſmen, denotes the noiſe of roes in rutting-time.

BELLOWS, a machine ſo contrived as to agitate the air with great briſkneſs, expiring and inſpiring the air by turns, and that only from enlarging and contracting its capacity.

This machine is uſed in chambers and kitchens, in forges, furnaces, and founderies, to blow up the fire: it ſerves alſo for organs and other pneumatic inſtruments, to give them a proper degree of air: all theſe are of various conſtructions, according to their different purpoſes; but in general they are compoſed of two flat boards, ſometimes of an oval, ſometimes of a triangular figure: two or more hoops, bent according to the figure of the boards, are placed between them; a piece of leather, broad in the middle, and narrow at both ends, is nailed on the edges of the board, which it thus unites together; as alſo on the hoops which ſeparate the boards, that the leather may the eaſier open and fold again; a tube of iron, braſs, or copper, is faſtened to the undermoſt board, and there is a valve within that covers the holes in the under-board, to keep in the air.

BELLY, in anatomy, the ſame with what is more uſually called abdomen, or rather the cavity of the abdomen. See the article ABDOMEN.

BELOMANCY, a ſort of divination by means of arrows, practiſed in the Eaſt, and particularly in Arabia.

Belomancy has been performed different ways, whereof one was this: ſuppoſe a parcel of arrows, eleven or more of them being put into a bag; theſe were afterwards drawn out, and according as they were marked or not, they judged of future events.

BELT, *Balteus*, in the military art, a leathern girdle for ſuſtaining the arms, &c. of a ſoldier.

BELTS, in aſtronomy, two zones, or girdles, ſurrounding the body of the planet of Jupiter, more lucid than the reſt, and of unequal breadth. See JUPITER.

BELVIDERE, in the Italian architecture, &c. denotes either a pavilion on the top of a building, or an artificial eminence in a garden; the word literally ſignifying a fine proſpect.

BEN BEEN, or BEHEN. See BEHEN.

BEN *of Judea*, a name ſometimes uſed for benzoin. See the article BENZOIN.

BENCH, or BANC, in law; ſee BANC.

Free BENCH ſignifies that eſtate in copyhold lands, which the wife, being eſpouſed a virgin, has after the deceaſe of her huſband for her dower, according to the cuſtom of the manor. As to this free-bench, ſeveral manors have ſeveral cuſtoms; and in the manors of Eaſt and Weſt Enbourne, in the county of Berks, and other parts of England, there is a cuſtom, that when a copyhold tenant dies, the widow ſhall have her free-bench in all the deceaſed huſband's lands, whilſt ſhe lives ſingle and chaſte; but if ſhe commits incontinency, ſhe ſhall forfeit her eſtate: nevertheleſs, upon her coming into the court of the manor riding on a black ram, and having his tail in her hand, and at the ſame time repeating a form of words preſcribed, the ſteward is obliged, by the cuſtom of the manor, to re-admit her to her free-bench.

Widow's BENCH. See WIDOW.

BENCHERS, in our inns of court, the ſenior members of the ſociety, who are inveſted with the government thereof.

BEND, in heraldry, one of the nine honourable ordinaries, containing a third part of the field when charged, and a fifth when plain. It is ſometimes, like other ordinaries, indented, ingrailed, &c. and is either dexter or ſiniſter.

BEND *Dexter* is formed by two lines drawn from the upper part of the ſhield on the right, to the lower part of the left, diagonally. It is ſuppoſed to repreſent a ſhoulder belt, or a ſcarf, when worn over the ſhoulder.

BEND *Siniſter* is that which comes from the left ſide of the ſhield to the right; this the French heralds call a barre.

BENDING, amongſt ſeamen, the faſtening two ends of rope to one another; to faſten a ſail to its yard or ſtay; to fix the cable to the anchor. See CABLE, CLENCH, SAIL.

BENDS, in naval architecture, the thickeſt and ſtrongeſt planks in a ſhip, reaching from end to end at her extreme breadth: when a merchant-ſhip is laden no deeper than to bring her bends down to the ſurface of the water, ſhe is ſaid to be in good ſailing order.

BENDY, in heraldry, is the field divided into four, ſix, or more parts diagonally, and varying in metal and colour.

The general cuſtom of England is to make an even number, but in other countries they regard it not, whether even or odd.

Counter BENDY is uſed by the French to expreſs what we ordinarily call bendy of ſix per bend ſiniſter, counterchanged.

Barry BENDY. } See the articles { BARRY.
Paly BENDY. } { PALY.

BENEDICITE, among eccleſiaſtical writers, an appellation given to the Song of the three children in the fiery furnace, on account of its beginning with the word Benedicite.

BENEDICTINS, in church hiſtory, an order of monks who profeſs to follow the rules of St. Benedict.

The Benedictins, being thoſe only that are properly called monks, wear a looſe black gown, with large wide ſleeves, and a capuche, or cowl, on their heads, ending in a point behind. In the canon law, they are ſtyled black-friars, from the colour of their habit.

The rules of St. Benedict, as obſerved by the Engliſh monks before the diſſolution of the monaſteries, were as follow: They were obliged to perform their devotions ſeven times in twenty-four hours, the whole circle of which devotions had a reſpect to the paſſion and death of Chriſt; they were obliged always to go two and two together. Every day in Lent they were obliged to faſt till ſix in the evening, and abated of their uſual time of ſleeping and eating; but they were not allowed to practiſe any voluntary auſterity without leave of their ſuperior: they never converſed in their refectory at meals, but were obliged to attend to the reading of the Scriptures: they alſo ſlept in the ſame dormitory, but not two in a bed; they lay in their cloaths; for ſmall faults they were ſhut out from meals; for greater, they were debarred religious commerce, and excluded from the chapel; and as to incorrigible offenders, they were excluded from the monaſteries. Every monk had two coats, two cowls, a table-book, a knife, a needle, and a handkerchief; and the furniture of their bed was a mat, a blanket, a rug, and a pillow.

BENEDICTION, or Bleſsing. The Hebrews, under this name, underſtand the preſent uſually ſent from one friend to another, as alſo the bleſſing conferred by the patriarchs, on their death-beds, upon their children.

The privilege of benediction was one of thoſe early inſtances of honour and reſpect paid to biſhops in the primitive church. The cuſtom of bowing the head to them, and receiving their bleſſings, was become univerſal. In the weſtern churches there was anciently a kind of benediction which followed the Lord's prayer; and after the communion the people were diſmiſſed with a benediction.

BENEFICE, *Beneficium*, in an eccleſiaſtical ſenſe, a church endowed with a revenue for the performance of divine ſervice; or the revenue itſelf aſſigned to an eccleſiaſtical perſon, by way of ſtipend, for the ſervice he is to do that church.

All ſuch preferments, except biſhoprics, are called benefices; and all benefices are, by the canoniſts, ſometimes ſtyled dignities: but we now ordinarily diſtinguiſh between benefice and dignity, applying dignity to biſhoprics, deaneries, archdeaconries, and prebendaries; and benefice to parſonages, vicarages, and donatives.

Benefices are divided by the canoniſts into ſimple and ſacerdotal; in the firſt there is no obligation but to read prayers, ſing, &c. the ſecond are charged with the cure of ſouls, or the direction and guidance of conſciences: ſuch are vicarages, rectories, &c.

The Romaniſts again diſtinguiſh benefices into regular and ſecular.

Regular or titular benefices are thoſe held by a religious, or a regular, who has made profeſſion of ſome religious order: ſuch are abbies, priories, conventuals, &c. or rather a regular benefice is that which cannot be conferred on any but a religious, either by its foundation, by the inſtitution of ſome ſuperior, or by preſcription: for preſcription, forty years poſſeſſion by a religious makes the benefice regular.

Secular benefices are only ſuch as are to be given to ſecular prieſts, that is, to ſuch as live in the world, and are not engaged in any monaſtic order. All benefices are reputed ſecular, till the contrary is made to appear. They are called ſecular benefices becauſe held by ſeculars; of which kind are almoſt all cures.

Some benefices, regular in themſelves, have been ſecularized by the pope's bull.

The canoniſts diſtinguiſh three manners of vacating a benefice, viz. *de jure*, *de facto*, and by the ſentence of a judge.

A benefice is vacated *de jure*, when the perſon enjoying it is guilty of certain crimes expreſſed in thoſe laws, as hereſy, ſimony, &c.

A benefice is vacated *de facto*, as well as *de jure*, by the natural death, or the reſignation of the incumbent; which reſignation may be either expreſs, or tacit, as when he engages in a ſtate, &c. inconſiſtent with it, as, among the Romaniſts, by marrying, entering into a religious order, or the like.

A benefice becomes vacant by the ſentence of a judge, by way of puniſhment for certain crimes, as concubinage, perjury, &c.

It is obſerved, that anciently there were five caſes by which benefices were acquired; by the nominative, as in royal nomination; by the genitive, as when the children of great men, &c. are provided of benefices by their birth; by the dative, as when ſpeaking of a benefice, it is ſaid *date*, and *dabitur vobis*; by the accuſative, as where, by virtue of an accuſation, either true or falſe, an incumbent is diſpoſſeſſed, and another admitted; by the ablative, as when benefices are taken away by force from the poor and helpleſs; but the vocative, which is the moſt juſt and legitimate, is out of uſe.

A Benefice *in Commendam* is that, the direction and management of which, upon a vacancy, is given or recommended to an eccleſiaſtic, for a certain time, till he may be conveniently provided for. See the articles Regular and Secular.

BENGAL, the moſt eaſterly province of the mogul's empire, lying at the bottom of a large bay, which takes its name from this province.

It is one of the moſt fertile provinces in India, being yearly overflowed by the Ganges, as Egypt is by the Nile.

BENGUELA, a kingdom upon the weſtern coaſt of Africa, between Angola and Jaga: it is alſo the name of the capital of that kingdom.

BENZOINE, or Asa-Dulcis, in the materia medica, a gum reſin, approaching the neareſt to ſtorax in fragrancy.

The tree which produces benzoine is a native of the Eaſt-Indies, particularly of the iſlands Siam and Sumatra. It has ſoft thin leaves, nearly like thoſe of the citron-tree, and bears a round fruit about the ſize of a hazelnut. It is never permitted to exceed the ſixth year, as being after this period unfit for yielding reſin; the inhabitants then cut it down, and ſupply it by a young one raiſed commonly from the fruit. One tree does not yield above three pounds of benzoine.

The juice exudes, from inciſions, in form of a thick white balſam: if collected as ſoon as it has grown ſomewhat ſolid, it proves internally white like almonds; and hence is called benzoamygdaloides: if ſuffered to lye long expoſed to the ſun and air, it changes more and more to a browniſh, and at laſt to a quite reddiſh brown colour. The dealers in this commodity never ſell us the fine white benzoine by itſelf; but mix it with the inferior and fouler kinds, that one may carry off the other: hence, in the very beſt benzoine of the ſhops, we meet with pieces of various colours, white, yellowiſh white, yellow, browniſh yellow, brown, reddiſh brown, and grey, all united into one lump. The dark coloured benzoine however, if it is free from earthy and woody impurities, and from admixtures of any other reſin, does not appear to be inferior in goodneſs to the white.

This reſin is moderately hard and brittle; and yields, on being rubbed or warmed, an extremely agreeable ſweet ſmell. It totally diſſolves in ſpirit of wine into a blood-red liquor, leaving only the impurities, which amount commonly to no more than about a ſcruple, upon an ounce: to water, it gives out a portion, not of gummy or mucilaginous, but of ſaline matter, of a peculiar kind, volatile and ſublimable in the fire, and which indeed is moſt effectually ſeparated by dry ſublimation; and hence called flowers of benzoine.

Some prepare the flowers from benzoine by itſelf, reduced into groſs powder; others mix it, in fine powder, with an equal quantity of waſhed ſand. An earthen pot or jar is filled with the matter to one half or one fourth its height, then covered with a conical paper cap, which, as ſoon as any conſiderable quantity is judged to be collected, is removed, and ſupplied by another, and the proceſs continued till nothing more will ſublime: the remaining benzoine, which appears of a blackiſh brown colour, may ſtill be uſed, if no ſand has been mixed, in compoſitions for yielding an odoriferous ſmoke, and for other like purpoſes. This method is not a little troubleſome, the quantity of flowers obtained by it ſmall, and the flowers themſelves commonly tinged of a yellowiſh or even a brown colour from ſome of the oil of the benzoine ariſing with them; for as the ſand grows continually hotter and hotter, it is ſcarce poſſible to prevent the heat increaſing ſo far as to elevate a portion of the oil.

The beſt way is to moiſten the benzoine, groſly powdered, with ſpirit of wine; and then proceed to diſtillation, with a very gradual ſand heat, in a wide necked glaſs retort. The flowers ariſe immediately after the ſpirit, partly in a concrete ſaline form, and partly in that of a white butter: the receiver being now changed, and the fire ſlowly increaſed, a ſmall portion of brown coloured flowers ſublimes, followed firſt by a ſubtile oil, afterwards by a browniſh oil, and at laſt by a black, thick empyreumatic one, together with an acid ſpirit. If the flowers and butter be diſſolved in diſtilled water over a gentle fire, the ſolution paſſed through a filter and ſet in the cold, the ſaline matter ſhoots into cryſtalline concretions, of a fine ſilver whiteneſs; this ſalt, like tartar, being difficult of ſolution, and when diſſolved in hot water, ſeparating again as the liquor cools: the diſſolution and filtration ſhould be performed as expeditiouſly, and the veſſel kept as much covered, as poſſible, to prevent any conſiderable diſſipation of the volatile matter. The ſalt ſtill retains, even after this purification, a portion of oil, as appears from its penetrating ſmell, and from its burning in the fire. The ſpirit of wine, which ariſes at firſt in the diſtillation, is impregnated with a little of the ſalt. The oil which follows the flowers, rediſtilled from earthy powders, or with water, may be uſed as an eſſential oil of benzoine; for it has little or nothing of an empyreumatic taint. From ſixteen ounces of benzoine are obtained two ounces of rough flowers, nine ounces of oil, and ſeven ſcruples of an acid ſpirit: the reſiduum weighs two ounces and a half.

Benzoine and its flowers are employed medicinally for reſolving and attenuating viſcid juices, particularly in diſorders of the breaſt: but the principal uſe of this fragrant reſin is in perfumes, and as a coſmetic, for ſoftening and ſmoothing the ſkin. For this laſt purpoſe, the benzoine is diſſolved in ſpirit of wine, with the addition ſometimes of ſtorax: the ſolution, mixed with water, forms a white liquor called virgins milk, which on ſtanding ſlowly depoſites a fine white magiſtery. Some add to the tincture of benzoine, a tincture or ſolution of litharge in vinegar; and thus obtain a compound virgin's milk and magiſtery, leſs innocent than thoſe from benzoine alone. A ſmall quantity of the oil of benzoine heightens the ſmell of perfumes, and corrects rancid unguents and balſams. *Neumann's Chemiſtry.*

BER, in botany, that ſpecies of the jugube-tree which produces the gum lacca. See Jugube.

BERAMS, a coarſe cloth, all made of cotton thread, which comes from the Eaſt Indies, and particularly from Surat. There are white plain berams, and others ſtriped with colours. The white are about eleven yards long, and about a yard wide; the red are fifteen yards long, and ſomething leſs than a yard wide.

BERBERIS, *Barberry*, in botany, a large prickly buſh, with brittle branches, covered with an aſh-coloured bark, under which lies another of a deep yellow; ſmall, ſmooth, ſomewhat oval, pale green leaves, finely ſerrated about the edges; and yellow monopetalous flowers, ſtanding in cluſters on the tops upon naked footſtalks, followed by oblong red berries, containing each generally two ſeeds: ſome of the individuals have no ſeeds in their berries, and ſometimes with and without ſeeds are found on one buſh. It grows wild on chalky hills in ſeveral parts of England, flowers in May, and ripens its fruit in September.

The fruit of this ſhrub is a mild aſtringent acid, acceptable to the ſtomach, and of great medicinal efficacy in hot bilious diſorders and a colliquative or putrid diſpoſition of the humours. Proſper Alpinus informs us, that the Egyptians employ, in ardent and peſtilential fevers and in fluxes, a diluted juice of the berries, prepared by macerating them in about twelve times their quantity of water, for a day or a night, with the addition of a little fennel ſeed or a piece of bread, and then preſſing out and ſtraining the liquor, which is ſweetened with ſugar, or ſugar of roſes, or ſyrup of citrons, and given the patient plentifully to drink: he ſays he took this medicine himſelf, with happy ſucceſs, in a peſtilential fever, accompanied with an immoderate bilious diarrhœa. Simon Paulli relates, that he was cured of a like diſeaſe, by the uſe of ſyrup of barberries, diluted with water; and that a concrete ſalt, which he calls tartar, may be obtained from the juice, by mixing two pounds of it with two ounces of lemon juice, digeſting them together in a ſand-heat for two days; then gently evaporating the filtered liquor to one half, and ſetting it in a cellar for ſome days: the tartar, he ſays, incruſtates the ſides and bottom of the glaſs, proves very grateful both to the palate and ſtomach, and reſiſts febrile heat and the corruption of the humours; from whence it may be preſumed to be the eſſential acid ſalt of the fruit: by further inſpiſſating the remaining juice, more of this ſaline ſubſtance ſeparates in the ſame manner. Among us, theſe berries are commonly made into jelly, by boiling them with an equal weight of fine ſugar, over a gentle fire, to a due conſiſtence, and then ſtraining the fluid through a wooden cloth. By drying the berries, their acidity is abated, and their aſtringency improved.

The leaves of the barberry buſh have likewiſe a not ungrateful reſtringent acid taſte, and have ſometimes been employed in the ſame intentions as the fruit, and as an ingredient in cooling ſalads. The inner yellow bark, in taſte auſtere and bitteriſh, is ſaid to be gently purgative, and to be ſerviceable in jaundices. Mr. Ray commends, in this diſeaſe, from his own experience, a decoction in ale or other liquors, or rather an infuſion in white wine, of the yellow bark both of the branches and the roots. It gives a deep yellow tincture both to watery and ſpirituous menſtrua. *Lewis's Hiſtory of the Materia Medica.*

BERECYNTHIA, the mother of the gods, in the pagan theology; ſo called from Berecynthus, a mountain in Phrygia. Anchiſes, in Virgil, compares Rome, in her future glories, to this deity.

Gregory of Tours ſays there was, in his time, an idol of Berecynthia or Cybele, worſhipped in Gaul, which they carried into their fields and vineyards in a cart, for the preſervation of the fruits of the earth; and that they marched in proceſſion before the deity, ſinging and dancing. One day this holy man, touched with the impiety of theſe idolaters, put up a prayer to heaven, and made the ſign of the croſs; whereupon the idol immediately fell to the ground, the cart and oxen remaining immoveable: the people whipped the oxen to make them go forwards, but all to no purpoſe. Upon this, four hundred of the multitude cried out, If ſhe be a deity, let her raiſe up herſelf, and make the oxen go on: but this not happening, they all turned Chriſtians. See Cybele.

BERENGARIANS, a religious ſect of the eleventh century, which adhered to the opinion of Berengarius, who, even in thoſe days, ſtrenuouſly aſſerted, that the bread and wine in the Lord's ſupper is not really and eſſentially, but only figuratively, changed into the body and blood of Chriſt.

His followers were divided in opinion as to the euchariſt: they all agreed that the elements are not eſſentially changed in effect: others admitted a change in part; and others an entire change, with this reſtriction, that to thoſe who communicated unworthily, the elements were changed back again.

BERGAMOT, the name of a fragrant eſſence extracted from a fruit which is produced by ingrafting a branch of lemon-tree upon the ſtock of a bergamot-pear. It is alſo the denomination of a coarſe tapeſtry, manufactured with flocks of ſilk, wool, cotton, hemp, ox, cow, or goat's hair, and ſuppoſed to be invented by the people of Bergamo.

BERGHMOT, an aſſembly, or court, held upon a hill in Derbyſhire, for deciding controverſies among the miners.

BERME, in fortification, a ſpace of ground left at the foot of the rampart, on the ſide next the country, deſigned to receive the ruins of the rampart, and prevent their filling up the foſſe. It is ſometimes paliſadoed, for the more ſecurity; and in Holland it is generally planted with a quick-ſet-hedge. It is alſo called liziere, relais, foreland, retraite, pas de ſouris, &c.

BERN-MACHINE, the name of an engine for rooting up trees, invented by Peter Sommer, a native of Bern in Switzerland.

This machine is repreſented by a figure on plate XIV. *fig.* 6. drawn from a model in the machine-room of the Society for the Encouragement of Arts, &c. It conſiſts of three principal parts, the beam, the ram, and the lever. The beam A B C, of which only one ſide is ſeen in the figure, is compoſed to two ſtout planks of oak three inches thick at leaſt, and ſeparated by two tranſverſe pieces of the ſame wood at A and C, about three inches thick. Theſe planks are bored through with correſponding holes, as repreſented in the figure, to receive iron pins, upon which the lever acts between the two ſides of the beam, and which are ſhifted higher and higher, as the tree is raiſed, or rather puſhed, out of its place. The ſides are well ſecured at the top and bottom, by ſtrong iron hoops.

The iron pins on which the lever reſts, ſhould be an inch and a quarter, and the holes through which they paſs, an inch and a half in diameter. The poſition of theſe holes is ſufficiently indicated by the figure.

The foot of the beam, when the machine is in action, is ſecured by ſtakes repreſented at G, driven into the earth.

The ram D, which is made of oak, elm, or ſome other ſtrong wood, is capped with three ſtrong iron ſpikes, repreſented at *f*, which take faſt hold of the tree. This ram is ſix or eight inches ſquare, and a ſlit is cut lengthwiſe through the middle of it, from its lower end at K, to the firſt ferule *a*, in order to allow room for the chain *g h*, to play round the pulley K, which ſhould be four inches thick, and nine inches in diameter. This ram is raiſed by means of the chain *g h*, which ſhould be about ten feet long, with links four inches and three quarters in length, and an inch thick. One end of this chain is faſtened to the top of the beam at C, while the other, after paſſing through the lower part of the ram, and over the pulley K, terminates in a ring or link repreſented *fig.* 5. the two ears *m*, *n*, of which ſerve to keep it in a true poſition between the two planks of the beam. In this ring the hook P is inſerted.

The hook is repreſented in profile, *fig.* 4. where F is the part that takes hold of the ring. But it muſt be obſerved, that the parts of this machine, repreſented in *fig.* 4, 5. are drawn on a ſcale twice as large as the whole engine, *fig.* 3.

The hook F, *fig.* 4. ſhould be made of very tough iron, as well as the handle D, and the arch E *e*. This handle ſhould be two inches thick at *z*, where it joins to the hook, and the thickneſs gradually leſſen by degrees up to the arch, which need not be more than half an inch thick.

On each ſide of the pin *z*, is a ſemi-circular notch, *x*, *y*, which reſts alternately on the pins, when the machine is worked. The hole D, and the arch E *e*, ſerve to fix a long lever of wood E F, *fig.* 3. by means of two iron pins; and by this contrivance the lever is either raiſed or depreſſed at pleaſure, in order to render the working of the machine eaſy in whatever part of the beam the lever may be placed: for without this contrivance the extremity of the lever E F, would, when the handle *d* F was near the top of the beam C, be much higher than men ſtanding upon the ground could reach. It muſt however be remembered that the lever is often ſhortened by this contrivance, and conſequently its power leſſened.

The machine is worked in the following method: It is placed againſt a tree, in the manner repreſented in the figure, ſo that the iron ſpikes at *f* may have hold of the tree, and the end of the beam A be ſupported by ſtakes repreſented at G. The iron handle, *fig.* 4. is placed in the opening between the two planks of the beam, and the wooden lever fixed to it by means of the iron pins already mentioned. The hook F takes hold of the chain, and one of the iron pins is thruſt into the outer row of holes, by which means the outer notch *x* will reſt on the pin, which will be now the center of motion; and the end of the lever E, *fig.* 3. being preſſed downwards, the other notch *y*, *fig.* 4. will be raiſed, and at the ſame time the chain, and conſequently the ram. The other iron pin is now to be thruſt into the hole in the inner row, next above that which was before the center of motion, and the end of the lever E, elevated, or puſhed upwards, the latter pin on which the notch *y* reſts, now becoming the center of motion. By this alternate motion of the lever, and ſhifting the pins, the chain is drawn upwards over the pulley K, and conſequently the whole force of the engine exerted againſt the tree. There is a ſmall wheel at L, in order to leſſen the friction of that part of the machine.

From this account the reader will very eaſily perceive that the machine is nothing more than a ſingle pulley, compounded with a lever of the firſt and ſecond order; and therefore its power may be eaſily computed from what will be obſerved under the articles LEVER and PULLEY.

It muſt however be remembered, that as the puſh of the engine is given in an oblique direction, it will exert a greater or leſſer force againſt the horizontal roots of the tree in proportion to the angle formed by the machine with the plane of the horizon; and that the angle of 45°. is the maximum, or that when the machine will exert its greateſt force againſt the horizontal roots of the tree. See the article COMPOSITION *of Forces*.

BERNARDIN MONKS, an order of religious, founded by Robert Abbot of Molôme: they are properly Ciſtercians, or Monks of Citeaux; but their order having been enlarged and amplified by St. Bernard, they were from thence called Bernardins. They follow the rule of St. Benedict, and are habited in white.

There are likewiſe Bernandin nuns; concerning whoſe inſtitution it is related, in the life of St. Bernard, that, in the year 1113, which was the fiftieth of the foundation of the abbey of Citeaux, St. Bernard, with thirty companions, devoted themſelves in that convent to a religious life; and as ſeveral of the companions of this ſaint were married, and their wives likewiſe had reſolved to quit the world, and dedicate themſelves to God, a monaſtery was founded for them, at the requeſt of St. Bernard, at Juilli in the dioceſe of Langres. The Bernandin nuns, as well as monks, are ſubject to the laws of the Ciſtercians. See CISTERCIANS.

BERNICLA. See the article BARNACLE.

BERRY, *Bacca*, a round fruit, for the moſt part ſoft, and covered with a thin ſkin, containing ſeeds in a pulpy ſubſtance; but if it be harder, or covered with a thicker ſkin, it is called *pomum*, apple.

Berries grow ſcattering upon trees and ſhrubs, and in that are diſtinguiſhed from *acini*, which are berries hanging in cluſters. See the article ACINUS.

They are of various ſizes, forms, properties, and uſes, according to the plants on which they grow. Some are uſed in dying, as French berries. See the article AVIGNON-BERRY.

The moſt remarkable in the materia medica are baccæ alkekengi, or winter cherry berries, agnus caſtus berries, bay berries, juniper berries, and myrtle berries. See the properties of each of theſe under its proper head, ALKEKENGI, AGNUS CASTUS, &c.

BERYL. See AQUA *Marina*.

BES, or BESSIS, in Roman antiquity, two thirds of the as. See the article AS.

BES alſo denotes two thirds of the jugerum. See the article JUGERUM.

BESANT, or BEZANT, a coin of pure gold, of an uncertain value, ſtruck at Byzantium, in the time of the Chriſtian emperors; from hence the gold offered by the king at the altar, is called beſant, or biſant.

BESANTS, in heraldry, round pieces of gold, without any ſtamp, frequently borne in coats of arms.

BETEL, in botany, an Indian plant, in great uſe and eſteem throughout the Eaſt, where it makes a conſiderable article of commerce.

The betel bears ſome reſemblance to the pepper-tree. Its leaves are like thoſe of ivy, only ſofter, and full of a red juice, which among the orientals is reputed of wonderful virtue for preſerving the teeth, and rendering the breath ſweet. The Indians are continually chewing theſe leaves, which makes their lips ſo red, and teeth black, a colour by them vaſtly preferred to the whiteneſs affected by the Europeans.

The conſumption of betel leaves is incredible, no perſon, rich or poor, being without their box of betel, which they preſent to each other by way of civility, as we do ſnuff.

BETHLEHEMITES, in church hiſtory, a religious order, called alſo ſtar-bearers, *ſtelliferi*, becauſe they were diſtinguiſhed by a red ſtar with five rays, which they wore on their breaſt, in memory of the ſtar that appeared to the wiſe men, and conducted them to Bethlehem.

There is an order of Bethlehemites ſtill ſubſiſting in the Spaniſh Weſt-Indies, who are habited like Capuchins, with this difference, that they wear a leather girdle inſtead of a cord, and on the right ſide of their cloak an eſcutcheon, repreſenting the nativity of our Saviour.

BETONY, in botany, a plant of very little taſte or ſmell, but what it has, reſides in an eſſential oil, as being elevated by water in diſtillation, though we can ſcarcely obtain any ſeparable oil upon diſtilling a moderate quantity of the herb.

This oil does not ariſe with rectified ſpirit, and hence the ſpirituous extract has a conſiderable taſte, whilſt the watery is almoſt inſipid. The ſpirituous extractions poſleſs the green colour of the plant, whilſt the watery have nothing of it; and indeed vegetable greens in general ſeem to reſide in a reſinous matter, or at leaſt in a ſubſtance that is ſoluble in ſpirit of wine, and not in water.

An ounce of the dry leaves of betony yielded with rectified ſpirit three drams two ſcruples, and afterwards with water two drams one ſcruple of extract; another ounce, treated firſt with water, gave five drams, and afterwards with ſpirit, one; ſo that whichſoever of theſe menſtrua is firſt applied, ſix drams are extracted, and two drams left.

This plant has been celebrated for abundance of medicinal virtues, but does not promiſe to have any conſiderable activity: its principal uſe is as an ingredient in herb ſnuffs, in compoſitions for ſmoking, and as a ſubſtitute to tea. It is obſervable, that the roots of betony differ greatly from the other parts of the plant; they operate both upwards and downwards, and ſeem to approach to the nature of the roots of hellebore. *Neumann's Chemiſtry.*

BETULA, the birch-tree, a ſmall tree common in moiſt woods, with numerous very flexible branches, and ſomewhat oval, ſharp pointed ſerrated, deep green leaves, hanging on long and weak pedicles; producing ſmall ſcaly cones, which contain little winged ſeeds. The bark, which appears externally white and chapt, conſiſts of a thick brittle ſubſtance, of a dark browniſh red colour, covered with three or four whitiſh, very thin, ſmoothy, flexible, tough, ſemitranſparent, membranous coats.

On deeply wounding or boring the trunk of the birch-tree early in the ſpring, there iſſues by degrees a very large quantity of a limpid, watery, ſweetiſh juice. It is ſaid, that one tree will bleed a gallon or two in a day; that the juice extracted near the root is much more watery, and of leſs taſte than that obtained from the upper part of the trunk, or from the branches; and that after the leaves have begun to appear, the juice loſes its ſweetneſs and becomes diſagreeable. This juice has been drank as an antiſcorbutic and deobſtruent; it ſenſibly promotes urine, and, if taken freely, looſens the belly. In keeping, it ſoon turns ſour, unleſs defended from the air by covering its ſurface with a little oil; by fermentation, it is converted into a weak vinous liquor. Inſpiſſated to the conſiſtence of a thin ſyrup, and ſet in a cool place for ſome weeks, it yields browniſh ſaline concretions, approaching, as Marggraf obſerves, to the nature of manna.

The leaves and the bark of the tree have been employed, chiefly externally, as reſolvents, detergents, and antiſeptics. Simon Paulli relates, that an univerſal pruriginous ſcabies, which had been received by infection, was cured by bathing with a decoction of the bark and young branches, in which ſome nitre and tartar had been diſſolved. With regard to the leaves, they diſcover to the touch a reſinous unctuoſity, and to the taſte an unpleaſant bitterneſs; rubbed a little, they yield a pretty ſtrong, and not diſagreeable ſmell. The bark has no ſmell; the thin membranes have no taſte; the thicker brittle part has a ſlight roughiſh one. This laſt gives a pale yellowiſh tincture to rectified ſpirit, and a deep yellowiſh-red to water; the watery infuſion ſtrikes a browniſh black colour with ſolution of chalybeate vitriol, but immediately throws off the colouring matter and becomes limpid, a phenomenon which I have not obſerved in other mixtures of this kind; or inſpiſſating the infuſion, the remaining extract proves moderately auſtere.

The bark of this tree has been recommended alſo in fumigations, for correcting contagious air. The membranes are highly inflammable, in burning yield no particular ſmell, and give out a reſinous exudation of no ſmell or taſte. The brittle part is leſs inflammable, emits a ſtrong acid vapour and no reſin.

This tree is propagated by ſuckers taken from the roots of old trees, which may be tranſplanted either in October or February, but October is to be preferred; for if the ſpring ſhould prove dry, thoſe planted in February will many of them fail; it delights in a poor ſoil, and will grow either in moiſt ſpungy ſoils, or in ſtony or gravelly marſhes, or bogs: when the young trees have been planted two years, you ſhould, if deſigned for underwood, cut them down within ſix inches of the ſurface, which will cauſe them to ſhoot out ſtrong and vigorous branches; but if they are deſigned for large trees, it will be much better to let them ſtand three years before you head them down; and when you do it, cut them within three inches of the ground, that their ſtems may be ſtraight and handſome: but you muſt obſerve, when they begin to put out, whether they produce more than one ſhoot; which if they do, you muſt cut off all but the ſtrongeſt and moſt convenient ſhoot, which muſt be trained up for a ſtem.

The timber of this tree, though accounted the worſt of all others, yet is not without its various uſes: the turners often uſe it to make chairs, &c. and the huſbandmen for making ox-yokes; it is alſo planted for hop-poles, hoops, &c. but, in places within twenty miles of London, it is kept often cut to make brooms, and turns to great account.

BEVEL, among maſons, carpenters, joiners, and bricklayers, a kind of ſquare, one leg whereof is frequently crooked, according to the ſweep of an arch or vault. It is moveable on a center, and ſo may be ſet to an angle.

The make and uſe of this inſtrument is pretty much the ſame as thoſe of the common ſquare and mitre, except that thoſe are fixed, the firſt at an angle of ninety degrees, and the ſecond at forty-five; whereas the bevel being moveable, it may in ſome meaſure ſupply the place of both, which it is chiefly intended for, ſerving to ſet off or transfer angles, either greater or leſs than ninety or forty-five degrees.

BEVEL-ANGLE, any other angle beſides thoſe of ninety or forty-five degrees.

BEVILE, in heraldry, a thing broken or opening like a carpenter's rule: thus we ſay, he beareth argent, a chief bevile, vert, by the name of Beverlis.

BEWITS, in falconry, pieces of leather, to which a hawk's bells are faſtened, and buttoned to his legs.

BEY, among the Turks, ſignifies a governor of a country or town. The Turks write it *begh*, or *bek*, but pronounce it bey.

This word is particularly applied to a lord of a banner, whom, in the ſame language, they call ſangiacbeg or bey. Every province in Turky is divided into ſeven ſangiacs or banners, each of which qualifies a bey, and theſe are all commanded by the governor of the province, whom they alſo call beglerbeg; but is lord of all the beghs or beys of the province; theſe beys are much the ſame as bannerets were formerly in England.

BEY *of Tunis*, the ſame with the dey of Algiers, is the prince or king of that kingdom.

BEZANS, cotton cloths, which come from Bengal: ſome are white, and others ſtriped with ſeveral colours.

BEZANT, or BESANT. See the article BESANT.

BEZANTHER, the branch of a deer's horn, next below the brow-antler.

BEZOAR, in natural hiſtory and medicine, a general name for certain animal ſubſtances, ſuppoſed to be effectual in preventing the fatal conſequences of poiſon.

Bezoars are ſtony concretions, formed in many land animals; in the ſtomach of goats, harts, horſes, aſſes, cows, &c. as well as in the urinary and gall-bladder of the human body. Several of theſe ſubſtances were by the credulity of former times celebrated as medicines of extraordinary virtue, and diſtinguiſhed by an oriental name, bezoar, which ſignifies a ſubduer of poiſons, or a lord over poiſons; hence bezoardic is become a common appellation for medicines ſuppoſed to be poſſeſſed of alexipharmic powers. The bezoar of the ape, and that of the porcupine, called *Piedra del porco*, have been valued moſt; ſingle ſtones having been ſold for ſixty and eighty pounds ſterling.

There are two ſorts of bezoar kept in the ſhops, diſtinguiſhed by the epithets oriental and occidental, from the countries where they are produced.

The oriental or beſt bezoar is found in the ſtomach of an animal, which is ſaid to bear a reſemblance both to the goat and the ſtag, to the former in the horns, beard, and tail; to the latter in the body, feet, and hair; called by ſome cervicapra, and by others capricerva; by Ray, *Gazella indica cornubus rectis longiſſimis nigris prope caput tantum annulatis.* The animal is deſcribed and figured by Kæmpfer, in his *Amænitates*, and ſaid to be met with in different parts of Perſia, China, and the Eaſt Indies. Thoſe that live upon the mountains, and feed on aromatic herbs, are ſuppoſed to afford a better bezoar than thoſe that live on the plains and valleys.

The bezoar-ſtone is generally obſerved to be formed about ſome vegetable matter which the animal has ſwallowed, and which is often found in the middle of the ſtone upon breaking it; as a bit of ſtraw, wood, ſtalk or rind of plants, &c. This nucleus is gradually covered with ſucceſſive incruſtations, one over another, which by conſtant motion in the ſtomach are rendered externally ſmooth and poliſhed. Such at leaſt is the common opinion of the production of bezoar.

The occidental bezoar is ſaid to be found in the ſtomach of an animal of the ſame genus with that which affords the oriental. This ſort of bezoar is not near ſo beautiful, ſo ſmooth, or ſo poliſhed as the other: it is commonly of a whitiſh aſh, or dark-grey colour; ſometimes browniſh or blackiſh; and ſometimes of a greeniſh yellow.

A ſcruple of occidental bezoar, digeſted with rectified ſpirit of wine, gave only half a grain of extract, of a yellowiſh-green colour, a ſomewhat rancid taſte, and no ſmell: the remaining powder appeared unaltered. Diſtilled water extracted alſo but half a grain from a ſcruple: this extract was of a greeniſh-brown colour, and had neither taſte nor ſmell.

Spirit of nitre and ſpirit of ſea-ſalt diſſolved greateſt part of the bezoar, and ſpirit of vitriol the whole: all the ſolutions were yellowiſh: from that made in the vitriolic acid, a little cryſtalline matter ſeparated.

Spirit of ſal ammoniac, common alkaline ley and cauſtic ley did not diſſolve any ſenſible quantity of the powder, but acquired from it a yellowiſh tinge; the cauſtic ley gained the deepeſt yellow.

On diſtilling two drams in an open fire, there aroſe twenty-two grains of a browniſh-yellow liquor, of an empyreumatic and ſomewhat volatile ſmell; on the ſurface of which ſwam two little drops of an empyreumatic oil; the caput mortuum weighed one dram and thirty-eight grains; it was quite black, and continued a ſubtile powder like the bezoar employed.

From theſe experiments it appears, that the occidental bezoar is more likely to be an animal production than the oriental, as it yields in diſtillation ſome ſmall portion of volatile urinous matter. It is nevertheleſs much inferior in value, as being leſs beautiful, and ſcarcely ever made uſe of in medicine. If the oriental and occidental bezoars were both genuine, or true animal calculi, they would probably be equal in virtue to one another, though certainly not equal to oyſter-ſhells and other common abſorbents. *Neumann's Chemiſtry.*

BEZOARDIC, an appellation given to whatever partakes of the nature of bezoar; alſo to compound medicines, whereof bezoar makes an ingredient.

BIA, in commerce, a name given by the Siameſe to thoſe ſmall ſhells which are called cowries throughout almoſt all the other parts of the Eaſt-Indies. See the article COWRIES.

BIBLE, βιβλος, the book, a name given by Chriſtians, by way of eminence, to a collection of the ſacred writings, containing thoſe of the Old and New Teſtament, and is juſtly looked upon as the foundation of the Jewiſh as well as the Chriſtian religion. The Jews, it is true, acknowledge only the Scriptures of the Old Teſtament, the correcting and publiſhing of which is unanimouſly aſcribed both by the Jews and Chriſtians to Ezra. Some of the ancient fathers, on no other foundation than that fabulous and apocryphal book the ſecond of Eſdras, pretend that the Scriptures were entirely loſt in the Babyloniſh captivity, and that Ezra had reſtored them again by divine revelations. What is certain is, that in the reign of Joſiah, there were no other books of the law extant, beſides that found in the temple by Hilkiah; from which original that pious king ordered copies to be immediately written out, and ſearch made for all the parts of the Scriptures; by which means copies of the whole became pretty numerous among the people, who carried them with them into captivity. After the return of the Jews from the Babyloniſh captivity, Ezra got together as many copies as he could of the ſacred writings, and out of them all prepared a correct edition, diſpoſing the ſeveral books in their natural order, and ſettling the canon of the Scripture for his time, having publiſhed them, according to the opinion of moſt learned men, in the Chaldee character, as the Jews, upon their return from the captivity, brought with them the Chaldaic language, which from that time became their mother-tongue, and probably gave birth to the Chaldee tranſlation of their Scriptures.

Chaldee BIBLE is only the gloſſes, or expoſitions made by the Jews when they ſpoke the Chaldee tongue; whence it is called *Targumim*, or paraphraſes, as not being a ſtrict verſion of the Scriptures.

Hebrew BIBLE. There is in the church of St. Dominic, in Bononia, a copy of the Hebrew Scriptures, which they pretend to be the original copy, written by Ezra himſelf. It is written in a fair character, upon a ſort of leather, and made up into a roll, after the ancient manner: but its having the vowel points annexed, and the writing being freſh and fair, without any decay, theſe circumſtances prove the novelty of the copy.

Greek BIBLE. It is a diſpute among authors, whether there was a Greek verſion of the Old Teſtament more ancient than that of the ſeventy-two Jews employed by Ptolemy Philadelphus to tranſlate that book: before Our Saviour's time, there was no other verſion of the Old Teſtament beſides that which went under the name of the Septuagint. See SEPTUAGINT. But after the eſtabliſhment of Chriſtianity, ſome authors undertook new tranſlations of the Bible, under pretence of making them more conformable to the Hebrew text. There have been about ſix of theſe verſions, ſome whereof are charged with having corrupted ſeveral paſſages of the prophets relating to Jeſus Chriſt; others have been thought too free in their verſions, and others have been found fault with for having confined themſelves too ſervilely to the letter.

Latin BIBLE. It is beyond diſpute that the Latin churches had, even in the firſt ages, a tranſlation of the Bible in their language, which being the vulgar language, and conſequently underſtood by every body, occaſioned a vaſt number of Latin verſions. Among theſe there was one which was generally received, and called by St. Jerom the vulgar or common tranſlation. St. Auſtin gives this verſion the name of the Italic, and prefers it to all the reſt. There were ſeveral other tranſlations of the Bible into Latin, the moſt remarkable of which are the verſions of St. Jerom, Santes Pagninus, cardinal Cajetan, and Iſiodore Clarius, all from the Hebrew text.

Beſides theſe tranſlations by Catholic authors, there are ſome made by proteſtant tranſlators of the Hebrew; the moſt eminent of their verſions are thoſe of Sebaſtian Munſter, Leo Juda, Sebaſtian Caſtalio, Theodore Beza, &c.

Syrian BIBLE, a very ancient tranſlation of the Scriptures into the Syriac language. Dr. Prideaux is of opinion that it was made in the firſt century after Chriſt; that the author of it was ſome Chriſtian of the Jewiſh nation; and that it is the beſt tranſlation of the Old Teſtament. This verſion is not always agreeable to the Hebrew text, but in ſome places more conformable to the Samaritan Pentateuch, and in others to the verſion of the Septuagint.

Arabic BIBLE. There are two ſorts of Arabic verſions of the Bible; the one performed by Chriſtians, the other by Jews. Among the former there is one printed in the Polyglots of Paris and England, but both the author and the time it was written are unknown. Among all the Jewiſh performances of this kind, one only has been printed entire, which was done by Erpenius, at Leyden, in the year 1622.

Ethiopic BIBLE. This verſion of the Old Teſtament was made immediately from the Greek text of the Septuagint; and there is a very plain agreement between this tranſlation and the Alexandrian manuſcript; the order of the chapters, the inſcriptions of the Pſalms, and every thing elſe being exactly ſimilar. The Ethiopians attribute this verſion to Frumentius, the apoſtle of Ethiopia, ſent thither by Athanaſius, biſhop of Alexandria.

Coptic, or *Egyptian* BIBLE, a tranſlation of the Scriptures made immediately from the Greek of the Septuagint; and in which the Egyptian tranſlator ſo religiouſly followed the Greek text, that he refuſed to make uſe of the labours of Origen and others, who had taken the pains to compare the Greek verſion with the Hebrew text. This verſion is doubtleſs very ancient, though neither the author, nor exact time of its being performed, are known.

Perſian BIBLE. There are ſeveral verſions of the Bible in the Perſian language, moſt of which are in manuſcript. Walton, in the London Polyglot, has publiſhed the goſpels, tranſlated by one Simon, the ſon of Joſeph, a Chriſtian of Perſia, who lived about the middle of the fourteenth century.

Turkiſh BIBLE. There are ſeveral manuſcript tranſlations of the Bible in the Turkiſh language; and a verſion of the New Teſtament was printed at London in the year 1666.

Armenian BIBLE, a very ancient tranſlation of the Scriptures into the Armenian language from the Greek of the Septuagint. Three learned Armenians were employed in this work, during the reign of Arcadius. An Armenian tranſlation was alſo printed at Amſterdam, in the year 1666, under the direction of an Armenian biſhop. Another was printed at Antwerp in 1670, by Theodorus Patræus; and the New Teſtament ſeparately in 1668.

French BIBLE. There are ſeveral tranſlations of the Bible in the French language, the oldeſt of which is that of Peter de Vaux, chief of the Waldenſes, who lived about the year 1160. Raoul de Preſle tranſlated the Bible into French, in the reign of Charles V. king of France, about the year 1380. In the year 1550, the doctors of Louvain publiſhed the Bible in French. There is alſo a French verſion by Iſaac le Maitre de Sacy, publiſhed in 1672, with explanations of the literal and ſpiritual meaning of the text. This work was received with the greateſt applauſe, and has been ſince often reprinted. There are alſo Bibles in the French language, tranſlated by Proteſtant writers, among which that publiſhed at Geneva in 1535, by Robert Peter Olivetan, and ſince often reprinted with the corrections of John Calvin and others, is the moſt valued.

Italian BIBLE. The firſt Italian tranſlation of the Bible, at leaſt the firſt printed tranſlation, is that of Nicolas Malerne, a Benedictine monk, printed at Venice in 1471. It was tranſlated from the Vulgate. The verſion of Anthony Brucioli, publiſhed at Venice in 1532, was prohibited by the council of Trent. There are alſo Italian tranſlations of the Bible by Calviniſts, particularly one by Maximus Theophilus in 1551, and another by John Deodati in 1607.

Spaniſh BIBLE. The firſt Spaniſh Bible was publiſhed in the year 1500, according to Cyprian de Valera; but the author of it is not known. In 1569, Caſſidore de Reyna, a Calviniſt, publiſhed a Spaniſh tranſlation of the Bible.

German BIBLE. The firſt and moſt ancient tranſlation of the Bible in the German language, is that of Ulphilas, biſhop of the Goths, about the year 360. This biſhop left out the books of Kings, which treat chiefly of war, leſt it ſhould too much encourage the martial humour of the Goths. An imperfect manuſcript of this verſion was found in the abbey of Verden, near Cologn, written in letters of ſilver, and thence called *Codex Argenteus*. This fragment was publiſhed by Francis Junius in 1665. The oldeſt printed Bible in the German language extant, is that of Nuremburg, publiſhed in 1447. The author is unknown. Martin Luther, after employing eleven years in tranſlating the Old and New Teſtament, publiſhed the Pentateuch in 1522, the hiſtorical books and the Pſalms in 1524, the books of Solomon in 1527, Iſaiah in 1529, and the other books in 1530. The language is pure, and the verſion clear; it was reviſed by ſeveral perſons of quality, who were maſters of all the delicacy of the German language.

Flemiſh BIBLE. There are numerous verſions of the Bible in the Flemiſh language; but the firſt that appeared with the author's name prefixed, was that of Nicolas Vinck, printed at Louvain in 1548. The Flemiſh verſions made uſe of by the Calviniſts till the year 1637, were copied principally from that of Luther. But the ſynod of Dort having in 1618, appointed a new tranſlation of the Bible to be made, deputies were named for that work, which was not finiſhed till the year 1637.

Daniſh BIBLE. The Scriptures were firſt publiſhed in the Daniſh language by Peter Palladius, Olaus Chryſoſtom, and John Maccabæus, in the year 1550. They followed Luther's German verſion. There is ſince another tranſlation in the Daniſh language, by John Paul Reſenius, biſhop of Zealand, publiſhed in 1605.

Swediſh BIBLE. In the year 1534, Olaus and Laurence publiſhed a Swediſh tranſlation of the Bible from the German verſion of Martin Luther. It was reviſed in 1617, by order of king Guſtavus Adolphus, and afterwards almoſt univerſally followed.

Bohemian BIBLE. The Bohemians have a Bible tranſlated by eight of their doctors, whom they had ſent to the ſchools of Wittemberg and Baſil, on purpoſe to ſtudy the original languages. It was printed in Moravia, in the year 1539.

Poliſh BIBLE. A verſion of the Bible in the Poliſh language is ſaid to have been made by Hadewich, wife of Jagellon, duke of Luthuania, who embraced Chriſtianity in the year 1390. In 1591, a Poliſh tranſlation of the Bible, by ſeveral divines of that nation, was publiſhed at Cracow. The Proteſtants publiſhed a Poliſh tranſlation from the German verſion of Martin Luther, in the year 1596, and dedicated it to Uladiſlaus IV. king of Poland.

Ruſſian, or *Moſcovite* BIBLE. A Ruſſian tranſlation of the Scriptures was publiſhed in 1581. It was tranſlated from the Greek by St. Cyril, the apoſtle of the Sclavonians; but this old verſion being too obſcure, Erneſt Gliik, who had been carried priſoner to Moſcow, after the taking of Narva, undertook a new tranſlation of the Bible in the Sclavonian language; but Gliik dying in 1705, Peter the Great appointed ſome particular divines to finiſh the work, which has not however, we believe, ever yet been printed.

Engliſh BIBLE. The firſt verſion of any part of the Scriptures into the language of our own country, was that of Adelm, biſhop of Sherburn, who flouriſhed in the year 709. That prelate made an Engliſh-Saxon verſion of the Pſalms. About the year 730, Eadfrid, or Ecbert, biſhop of Lindisferne, tranſlated ſeveral of the ſacred books into the ſame language. Venerable Bede, who died in 735, is alſo ſaid to have tranſlated the whole Bible into Saxon; but Cuthbert, Bede's diſciple, in enumerating the works of his maſter, mentions only his verſion of the goſpel of St. John, without ſaying any thing of the other books. Elfric, abbot of Malmſbury, made an Anglo-Saxon verſion of ſeveral books of the Bible: this work was afterwards printed at Oxford in 1699. There is alſo an old Anglo Saxon verſion of the four goſpels, publiſhed by Matthew Parker, archbiſhop of Canterbury, in 1571; but the author of it is not known. Dr. Mill obſerves that this verſion was taken from a Latin copy of the old Vulgate. With regard to the Engliſh tranſlations of the Bible, the moſt ancient is that of John de Treviſa, a ſecular prieſt, who tranſlated the Old and New Teſtament into Engliſh, at the requeſt of Thomas lord Berkley: he lived in the reign of Richard the Second, and finiſhed his tranſlation in 1357. The ſecond author who undertook this work was the famous Wickliff, who lived in the reigns of Edward the Third and Richard the Second. Manuſcripts of this verſion are ſtill preſerved in ſeveral libraries in England. In the year 1534, an Engliſh verſion of the Bible, done partly by William Tindal, and partly by Miles Coverdale, was brought into England from Antwerp. But the biſhops finding great fault with this verſion, a motion was made and carried in convocation, for making a new tranſlation of the Scriptures, to be placed in all the churches. The tranſlation was accordingly begun immediately, and the whole impreſſion finiſhed in three years. Fuller mentions another tranſlation of the Bible, printed in the year 1549. In the reign of queen Elizabeth, the *Biſhops Bible* appeared;

ſo called, becauſe ſeveral prelates were concerned in that verſion. In the ſecond year of James I. a reſolution was taken, at a conference held at Hampton-Court, for a new tranſlation of the Bible; which deſign was executed by forty-ſeven tranſlators, in the year 1607. And this tranſlation is now read by authority in all the Engliſh churches.

The learned Selden, ſpeaking of the Bible, ſays, "The Engliſh tranſlation of the Bible is the beſt tranſlation in the world, and renders the ſenſe of the original beſt, taking in, for Engliſh tranſlation, the Biſhops Bible, as well as king James's. The tranſlators, in king James's time, took an excellent way. That part of the Bible was given to him who was moſt excellent in ſuch a tongue (as the Apocrypha to Andrew Downs); and then they met together, and one read the tranſlation, the reſt holding in their hands ſome Bible, either of the learned tongues, or French, Spaniſh, Italian, &c. If they found any fault, they ſpoke; if not, he read on."

BIBLIOTHECA, in its original and proper ſenſe, denotes a library or place for depoſiting books.

The word is Greek, *βιβλιοθηκη*, and compounded of *βιβλιον*, a book, and *θηκη*, a repoſitory.

Bibliotheca, in matters of literature, denotes a treatiſe giving an account of all the writers on a certain ſubject. Thus, we have bibliothecas of theology, law, philoſophy, &c.

There are likewiſe univerſal bibliothecas, which treat indifferently of all kinds of books; alſo ſelect bibliothecas, which give an account of none but authors of reputation.

Many of the bibliothecas agree, in moſt reſpects, with what are otherwiſe called memoirs or journals of literature, except that theſe laſt are confined to new books; but there are other bibliothecas that differ in nothing from catalogues of the writers on certain ſubjects.

BICE, or Bise, among painters, a blue colour prepared from the lapis armenus. Bice bears the beſt body of all bright blues uſed in common work, as houſe-painting, &c. but it is the paleſt in colour; it works indifferently well, but inclines a little to ſandy, and therefore requires good grinding. Next to ultramarine, which is too dear to be uſed in common work, it lies beſt near the eye of all other blues.

BICEPS, in anatomy, the name of ſeveral muſcles: as the

Biceps-humeri, or Cubiti. This is a muſcle of the arm, and has two heads: the firſt of which ariſes, with a long, round tendon, from the upper edge of the acetabulum ſcapulæ, running under the ligament of the articulation, in a channel, on the head of the ſhoulder-bone, wherein it is incloſed by a proper ligament: the other ariſes with a ſomewhat broad, flat, and long tendon, at the extremity of the proceſſus coracoides ſcapulæ; in its deſcent it ſtrictly adheres to the coracobrachialis, and parting from it, both theſe heads compoſe a large fleſhy belly, which, becoming tendinous near the cubit, is inſerted by a ſtrong round tendon to the tubercle, at the upper head of the radius. When this muſcle acts, the cubit is bended.

Biceps Tibiæ, or Femoris, a muſcle of the leg with two heads; the ſuperior ariſing with a round tendon from the protuberance of the iſchium; and the other, being the ſhorteſt, from the lower part of the os femoris: both which join together, and are inſerted by one tendon into the ſuperior and external part of the perone.

Beſides the office commonly aſſigned to this muſcle, in bending the tibia, together with the ſartorius and membranoſus, it is likewiſe employed in turning the leg, together with the foot and toes, outwards, when we ſit with the knees bended.

BICKERN, the beak-iron of an anvil. See the article Anvil.

BICORNIS, in anatomy, a name for the os hyoides. See the article Hyoides.

BIDON, a liquid meaſure, containing about five pints of Paris, that is, about five quarts Engliſh, wine meaſure. It is ſeldom uſed but among ſhips crews.

BIGAMY, the poſſeſſion of two wives at the ſame time. This is the interpretation of the word, in a law paſſed 1 Jac. I. which makes bigamy felony. Among the Romans, perſons convicted of bigamy were branded with a note of infamy; and in France, they were anciently puniſhed with death.

Bigamy, in the canon law, is when a perſon either marries two women ſucceſſively, or only marries one woman who had been married before. Both which caſes are accounted impediments to be a clerk, or to hold a biſhopric. It is alſo bigamy when a perſon marries a woman who had been debauched before; or when he hath known his own wife after ſhe has been debauched by another.

The Romaniſts make a kind of bigamy by interpretation; as when a perſon in holy orders, or that has made profeſſion of ſome monaſtic order, marries. This the biſhop can diſpenſe with on ſome occaſions.

Spiritual Bigamy is when a perſon holds two incompatible benefices, as two biſhoprics, two vicarages, &c.

BIGHT, amongſt ſeamen, the double part of a rope.

BIGNONIA, the trumpet-flower, in botany, a genus of plants, whoſe flower is monopetalous, with a mouth campanulated, and divided into five ſegments: the fruit is a pod with two cells and two valves, containing ſeveral imbricated, compreſſed, and winged ſeeds. There are no medicinal virtues aſcribed to this plant.

BIGOT, a perſon fooliſhly obſtinate and perverſely wedded to any opinion, but particularly an opinion of a religious nature.

BILANDER, in the ſea language, a veſſel of two maſts, not very common; the mainſail of which, inſtead of ſtretching acroſs on a parallel yard like that of a ſhip, is extended fore and aft, or along the ſhip, reaching from the middle to the ſtern, the fore-moſt end of the yard inclining downwards before the maſt, and the aft-moſt or hind part being ſloped up or peeked like that of a mizen. See Mainsail Mizen.

BILE, Bilis, a yellow bitter liquor, ſeparated from the blood in the liver, collected in the porus biliarius and gall-bladder, and thence diſcharged by the common duct into the duodenum.

The uſefulneſs and neceſſity of the bile, for the preſervation of life and health, are ſufficiently known to every one who is acquainted with the rational and ſolid principles of phyſic. Its being found in every the moſt minute animal is a ſufficient proof of this; for there is not a poſſibility of finding, in the whole extent of nature, a ſingle inſect deſtitute of a bilious humour: and indeed the bile lodged in the body of animals is a real and genuine medicine, wiſely elaborated by unerring nature, for preventing diſeaſes, deſtroying their cauſes, and correcting the faults and diſorders of the conſtitution; and by means of its incomparable virtue and energy, animals are kept alive, and preſerved in an eaſy and comfortable ſtate of health. Since then the bile is ſo highly uſeful and efficacious in maintaining a ſtate of health in the body, and proving, as it were, a natural and univerſal medicine, it muſt of courſe follow, that when this liquor is either faulty, with regard to its quantity, or depraved by a receſs from its due temperature and craſis, a ſure and unavoidable foundation for diſeaſes muſt be laid: ſince then many, and theſe too, formidable diſorders derive their origins from ſome fault of the bile, the principal virtue and energy of the medicines employed in curing them ought to conſiſt in correcting this liquor when peccant in quality, generating it when defective, or evacuating it when too abundant in quantity: for as the bile, when in its due ſtate, is juſtly to be accounted a true and genuine medicine to the body; ſo we muſt readily grant, that the moſt important of all other medicines are ſuch as are calculated for reducing this liquor to a natural and temperate ſtate.

It is well known to phyſicians and anatomiſts, that the principal, if not the only office of the liver, is, by a beautiful mechaniſm, to filtrate and ſtrain that active, ſaline, and ſulphureous humour, called the bile, from the blood through the trunk of the vena porta, the hepatic artery, and its glandulous kernels. It muſt be owned, anatomiſts are not agreed among themſelves whence the gall-bladder, adhering to the liver, is ſupplied with the bile it receives; for ſome of them are of opinion, that the tunica glanduloſa ſeparates from the blood conveyed thither by the cyſtic arteries: others again maintain, that there are ſome very minute ducts inſerted in the bottom of the gall-bladder, by means of which the bile is conveyed to it; and another claſs of anatomiſts venture to affirm, that there are certain cyſti-hepatic ducts, by means of which the bile is immediately conveyed to the receptacles. But what judgment we ought to form concerning theſe different opinions, we may learn from the following experiment made by Bohnius and ſome others. Upon opening a dog, the whole bile was expreſſed from the gall-bladder, and the cyſtic duct tied; but the ſubject remaining alive for ſome time after, they expected to find ſome more bile in the gall-bladder, notwithſtanding the ligature on the cyſtic duct, and though all communication was cut off between the gall-bladder and the porus hepaticus. But they were diſappointed, for inſtead of bile they found only a little grumous blood. Hence the more accurate anatomiſts juſtly maintain, that the bile lodged in the gall-bladder is conveyed to it from the common hepatic duct itſelf; for the communication between theſe ducts is highly obvious, ſince, by blowing into the ducts cholodochus, both the gall-bladder and ductus hepaticus are inflated.

The bile in the gall-bladder differ very conſiderably from that in the liver; for the former is thicker, more acrid, more bitter, and of a deeper colour than the latter, which is more fluid, more diluted, and leſs bitter.

Let us now enquire into the particular manner in which the bile is generated and elaborated in the body. Firſt of all, then, we muſt obſerve that the bile does not exiſt in the blood, under the ſame form, and in the ſame ſtate in which it appears in its receptacles, which are the porus hepaticus and gall-bladder; for neither the blood nor ſerum are bitter, nor in a natural ſtate are they yellow; but the ſerum becomes ſo by an admixture of bile: for which reaſon it is plain, that the materials of which it is compoſed are only lodged in the blood; which does not at all appear improbable, when we conſider, that large quantities of ſulphur, earth, ſalt, phlegm, and mucus, of all which the bile is compoſed, are found in the blood.

Now it is known from chymico-mechanical experiments, that the qualities, properties, taſtes, and ſmells, of bodies, depend entirely upon the mixture, union, poſition, craſis, and texture of their various parts; which, when changed or deſtroyed, a proportionable change is induced in the taſte, ſmell, conſiſtence, and virtues of the body. For this reaſon, a peculiar mixture of the pinguinous, ſaline, earthy, and aqueous parts of the blood, ſeparated from the blood and ſerum, by means of their inteſtine motion, conſtitutes and makes up the bile. But to us it ſeems ſomewhat improbable, that the bile ſhould conſiſt immediately of the chylous parts of the blood, or thoſe which are moſt ſlightly united with it; but we are of opinion, that all theſe parts, being reſolved and ſeparated from the blood, by means of its inteſtine motion, are afterwards united, and form the bile. Hence we may plainly ſee, that a large quantity of bile muſt neceſſarily be generated in people whoſe blood is agitated with a ſtrong and violent inteſtine motion: Hence it happens, that young men of choleric habits, who inure themſelves to exerciſe, and live upon hot foods, abound with bile; whereas old men, children, the phlegmatic, the idle, and the lazy, have an aqueous, thin, and inactive bile. Burning, continued, and tertian fevers afford us a ſignal proof of this; ſince, in them, too great a quantity of bile is produced by the violent inteſtine motion, which diſſolves the contexture of the blood; for it is ſurpriſing to obſerve what large quantities of bile are daily diſcharged in the above-mentioned fevers, by urine, ſtool, and vomit; for which reaſon the ancients imagined, that the bile thus diſcharged was the productive cauſe of the fever, whereas it is rather its effect. For inſtance, we obſerve, that the more violent and laſting a tertian fever is, the excrements are proportionally more bilious; nor does nature ceaſe to generate new bile, even during the paroxyſm of the fever: but this fever is removed, or rather ſtopped and ſuppreſſed for a while, by the uſe of that celebrated medicine the Peruvian bark; for, by uſing it a ſhort time, the fiery colour of the urine is removed, it becomes thin and aqueous, and the excrements aſſume their natural colour; but as ſoon as the fever returns, all the ſymptoms return with it. From what has been ſaid, it is ſufficiently plain, that the blood itſelf may, by a too hot inteſtine motion, be reſolved into bile, and other excrementitious liquors. The truth of this is alſo confirmed to us by hectic and latent fevers, where the blood itſelf is, by a continual and exceſſively violent inteſtine motion, at laſt conſumed, and converted into bile and excrements. Among the few that have adverted to this circumſtance, none have been more explicit than Hildanus, who (in *Select. Medic*) has theſe words: "It is ſomething wonderful and ſurpriſing, that, on ſome occaſions, large quantities of "bile ſhould be evacuated, and yet the gall-bladder not "be found empty after the death of the patients: it is "not, in conſequence of this, to be doubted, but that "the blood is, by an inflammatory heat, parched and "converted into bile." We farther obſerve, that the more we abſtain from food, and the more exerciſe we uſe, a proportionably larger quantity of bile is generated; whereas an inactive life, and high feeding, prevent and hinder its generation.

Having taken a view of the origin of the bile, and its generating cauſe, we ſhall now enquire in what manner the particles, forcibly ſeparated from the blood by its inteſtine motion, are united into bile; which phœnomenon may be deduced from the ſlow and languid progreſs of the blood through the liver.

The blood is conveyed to the liver by the vena porta, which being a venous veſſel, the motion of the blood through it muſt of courſe be ſlow. The vena cava carries back the blood to the heart. The hepatic artery conveys nouriſhment to the parts of which the liver is compoſed; and the biliary ducts carry the ſecreted bile partly through the ductus cholodochus to the duodenum, and partly through the cyſtic duct to the gall-bladder; for indeed the only uſe and deſign of the liver is to ſeparate the ſulphureous, torrefied, and lixivial parts of the blood and ſerum conveyed into it through the vena porta; ſo that the ancients were miſtaken, when they believed that the liver was the principal laboratory of ſanguification.

The bile, which is a thick humour, and heavier than the blood itſelf, requires a mechanical apparatus, of a particular kind, for its ſecretion: for the ſecretion of a thick humour, it is neceſſary that the blood flowing into the ſecretory organ ſhould be thick, that a fine liquid may not paſs in too large a quantity through its capacious ducts.

As the ſeparation of thick humours requires pretty large canals and ducts, and as a thin liquid paſſes through theſe with the ſame, and even greater eaſe, than a thick one; hence, leſt too thin a lymph ſhould be ſecreted, it was neceſſary that the blood ſhould, in a great meaſure, be previouſly deprived of its thin lymphatic part, which is done in the kidnies, the ſtomach, the whole inteſtine tube, the omentum, and pancreas, through all which parts the blood muſt neceſſarily paſs, before it reaches the liver.

That the bile may be ſecreted in the liver, it is requiſite that its motion and progreſs through that organ ſhould be ſlow. For, in general, all the ſecretions and excretions are more advantageouſly carried on by a ſlow than accelerated and rapid motion, becauſe, during the former, the fluid parts are more eaſily ſeparated from thoſe which are more thick and ſolid, and the fine aqueous parts are carried into the lymphatic veſſels, of which there is a great number in the liver; and thoſe that are thicker are conveyed through the biliary ducts. In order to form a clear idea of the ſeparation of the thick bilious humour, we muſt carefully attend to the ſingular ſtructure of the vena cava, and its connexion with the vena porta, ſince in theſe there is a peculiar kind of mechaniſm, not to be obſerved in any other parts of the body. For though in other parts the extremities of the arteries are joined to thoſe of the veins, and form one continual canal; yet this does not happen in the liver, for the minute ramifications of the vena cava are inſerted in the ſides of the vena porta, in ſuch a manner as to form right angles with them, for no other reaſon, than that the blood, which is thinner than the bile, may be forced into the orifices of the vena cava, juſt as the chyle is into the inteſtines,

PLATE XXII. Facing Brazier

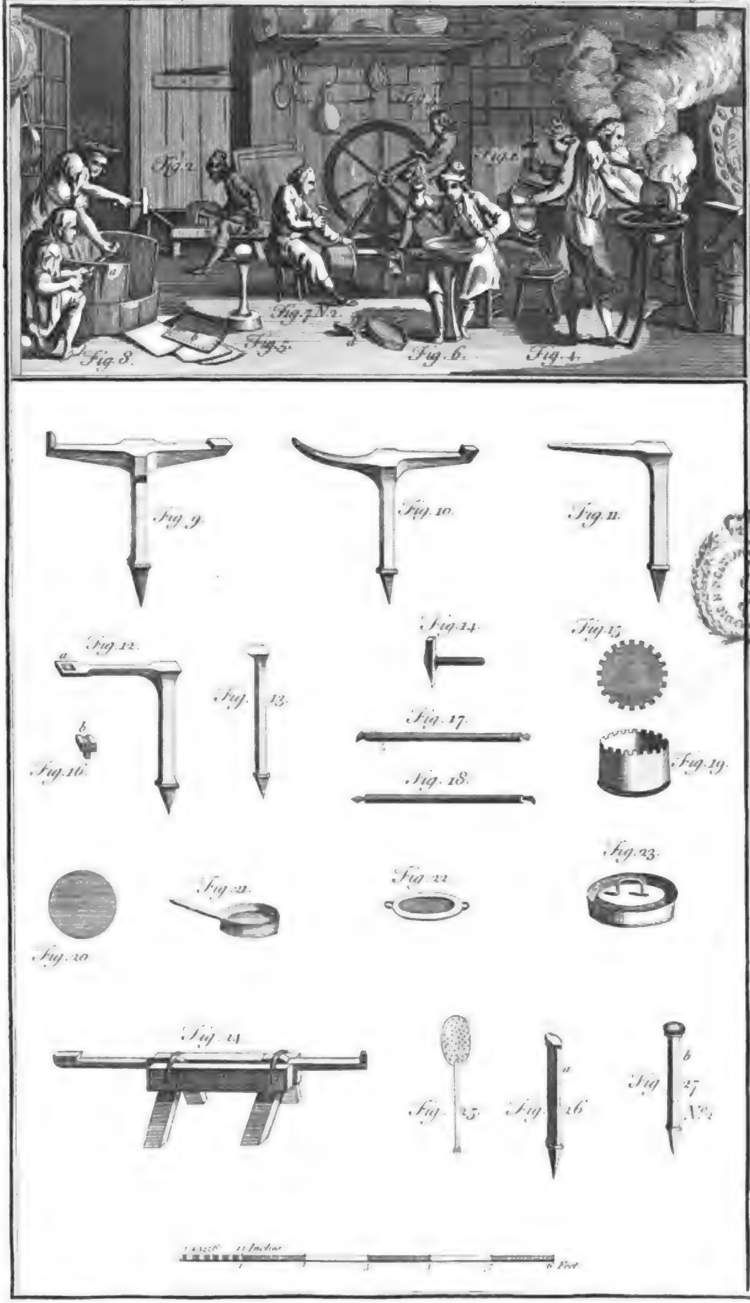


Fig. 2
Fig. 1
a
Fig. 8
Fig. 5
Fig. 7 N.2
a
Fig. 6
Fig. 4
Fig. 9
Fig. 10
Fig. 11
Fig. 14
Fig. 15
Fig. 12
a
Fig. 13
b
Fig. 16
Fig. 17
Fig. 18
Fig. 19
Fig. 23
Fig. 22
Fig. 21
Fig. 20
Fig. 24
Fig. 25
a
Fig. 26
b
Fig. 27
N.2
11 Inches
1
2
3
4
5
6 Feet

teſtines, after it has left the thick bile, which is then conveyed into the biliary ducts adjacent to the vena porta, and thence forced through the ductus choledochus and communis to the duodenum, and through the ductus cyſticus to the gall-bladder.

Though the bile, in conſequence of the ingredients of which it is compoſed, is a humour diſagreeable both to the ſolid and fluid parts of the human body, and in this ſenſe excrementitious; yet, with regard to the elaboration of the chyle, it is highly uſeful and neceſſary, and conſequently ought not to be diſcharged from the body, till it has exerted itſelf to that purpoſe.

The expanſion of the ſtomach, by means of the aliments, and the fermentation they undergo in it, very much aſſiſt the conveyance of the bile from the gall-bladder to the duodenum.

The ſituation of the gall-bladder is very remarkable, ſince its neck is higher than its bottom; for which reaſon, the aſcent of the bile is very difficult, eſpecially ſince it muſt flow from a wide to a narrow place. Then again, becauſe the ductus choledochus paſſes a long way between the ſecond and third coats of the duodenum, and at laſt opens with a round orifice into its cavity, the bile cannot at all times be diſcharged into the duodenum, but only when the inteſtines are relaxed, and the gall-bladder compreſſed by the right ſide of the ſtomach, when rendered turgid by the quantity and fermentation of the aliments.

The larger the quantity of aliments taken into the ſtomach is, the more it muſt be expanded, and conſequently the greater the compreſſion of the adjacent gall-bladder muſt neceſſarily be; for which reaſon the bile muſt on theſe occaſions flow plentifully to the inteſtines.

It is a circumſtance deſerving our attention, that in animals whoſe ſtomachs are become flaccid by long faſting, the gall-bladder is turgid and diſtended; whereas, after they have taken a large quantity of aliments, it is obſerved to be only half full. It is alſo remarkable, that in human fœtuſes the gall-bladder is found diſtended with bile, becauſe in them the ſtomach is collapſed, and free from expanſion. *Hoffman.*

The bile, when out of the body, is highly bitter, and the moſt acrid of all the animal fluids; it is neither of an alcaline nor an acid quality. It reſiſts acceſcence, and conveys the ſame quality to other ſubſtances with which it is mixed. It tends very much to putrefaction, which it promotes, when added to other ſubſtances diſpoſed to it. It very ſoon mixes with water; and, when inſpiſſated over a gentle fire, it diſſolves, if expoſed to the air. It does not burn in the fire, unleſs it be previouſly dried. It renders oil and oleaginous ſubſtances miſcible with water. If it be rubbed with any tenacious ſubſtances, ſuch as reſins or gums, it reſolves and attenuates them. It is coagulated by fire, alcohol of wine, acid ſpirits, and extract of galls. See *Boerhaave Chym.* Vol. I and his *Inſtitut. Med.* Sect. 99.

From the preceding, and a great number of other experiments made on this fluid by Baglivi, Du Hamel, &c. it plainly appears, that the bile is a humour compoſed of an oil, a ſalt, and water. It may therefore be conſidered as a liquid animal ſope, ſo that it is of an abſtergent and reſolvent quality. That it is ſo, the practice of ſome tradeſmen is a ſufficient proof; for dyers of cloth, in order to take out the greaſe which ſticks to the wool, and hinders the adheſion of the colour, uſe ſope, or putrid urine, after it has aſſumed an alkaline nature, or a lixivium of ſome fixed alkali: but they may, with equal ſucceſs, uſe ox gall for the ſame intention. Painters alſo uſe the bile of animals for mixing and diluting their colours. It diſcovers its efficacy to be the ſame in medicines, where a ſaponaceous quality is required, or where the intention is to abſterge, where the ſluggiſh veſſels are to be ſtimulated, where a tenacious ſubſtance is to be reſolved, or a viſcid one attenuated. See *Boerh. Aph.* LXXV. 5.

Beſides, as bile has for an ingredient a ſalt, which, though not an alkali, yet inclines and as it were approaches to it like other animal ſalts, it muſt of courſe prove an efficacious medicine in thoſe diſorders where an acid is to be reſiſted and corrected; ſo that it muſt be beneficial to bodies which are prone to generate acids, to ſuch as abound with mucous and pituitous humours, and to thoſe who lead a ſedentary life, or labour under loſs of appetite. It is alſo added to purgative medicines, with a view to lubricate, ſtimulate, and reſolve. The method of uſing it is to dry it a little, and make it up into ſmall pills: three or four grains may be given for a doſe to adults; but, for infants, one grain of it is ſufficient for a doſe. It ſeems to be owing to this ſaponaceous reſolvent quality, that a few drops of the bile extracted from a living dog, and mixed with the aqua epileptica of Langius, produce the deſired effect in the cure of the epilepſy. See *Act. Haffn.* Vol. III. *Obſ.* 20.

From theſe circumſtances we are enabled to diſcover the reaſon why Boerhaave recommended the uſe of bile, not only againſt a ſpontaneous gluten, or viſcid humours in general; but more eſpecially preſcribed it againſt the coagulums formed in the primæ viæ of children.

BILGE, in naval architecture, the ſpace of a ſhip's bottom comprehended between the keel and the part whereon ſhe would reſt when laid aground; or more particularly the latter only: or bilges are thoſe parts of a ſhip's bottom which approach nearer to an horizontal than a perpendicular direction, and are terminated by the bow forward and by the counter abaft. See Bow, Counter, Keel.

BILINGUIS, in a general uſe, implies a perſon who ſpeaks two languages; but in law it is uſed to ſignify a jury in a trial between an Engliſhman and a foreigner, when one half are natives, and the other ſtrangers.

BILIOUS, ſomething relating to the bile, or that partakes of its nature.

Bilious *Fever.* See Fever.

BILL, in mechanics, a cutting inſtrument of iron, in the form of acreſcent, uſed by huſbandmen, gardeners, &c.

Bill, in trade, ſignifies an account of goods delivered to, or of work done for, a perſon.

Bill *of Credit*, an order given by a merchant or banker to a perſon, impowering him to receive money from his correſpondents in foreign countries.

Bill *of Entry*, an account of goods entered at the cuſtom-houſe, both inwards and outwards.

Bill *of Exchange*, a ſhort order written on a ſlip of paper, by a merchant, &c. for paying to ſuch a perſon, or his order, and in ſome countries to the bearer, in a diſtant place, a certain ſum of money.

There are three things neceſſary to conſtitute a bill of exchange. 1. That it be drawn in one place upon ſome perſon in another. 2. That there be three perſons concerned, the drawer, the preſenter, or perſon in whoſe favour it is drawn, and the acceptor, or him on whom it is drawn. It muſt alſo mention that the value which the drawer has received, is either in bills of exchange, in money, merchandize, or other effects, which are to be expreſſed.

Theſe bills are made payable either at ſight, or ſo many days, weeks, or months after date; the ſpace of a month being called uſance, and two or three months after date, double or treble uſance.

Bills of exchange are alſo either inland or foreign; the former is ſaid to be only in the nature of a letter; but the latter is more regarded in law, becauſe it is for the advantage of commerce with other countries, and conſequently renders it an object of public concern.

Not only the drawer, but alſo every indorſer of a bill is liable to the payment of it; for an indorſer charges himſelf in the ſame manner, as if he had originally drawn the bill: and the plaintiff, in an action in ſuch a caſe, is not obliged to prove the drawer's hand, becauſe the indorſer becomes a new drawer. He muſt however prove that he demanded the money of the drawer or drawers, or that he made enquiry, and could not find them in convenient time; for by the cuſtom eſtabliſhed among merchants, the indorſer is to receive the money of the firſt drawer if he can; but if he cannot the indorſer muſt anſwer it.

The forging a bill of exchange, or any acceptance, is felony.

Bill *of Lading*, an acknowledgement ſigned by the maſter of the ſhip, and given to a merchant, &c containing an account of the goods which the maſter has received on board from that merchant, &c. with a promiſe to deliver them at the intended place for a certain ſum of money. Each bill of lading muſt be treble, one for the merchant who ſhips the goods, another to be ſent to the perſon to whom they are conſigned, and the third to remain in the hands of the maſter of the ſhip. It muſt however be obſerved, that a bill of lading is only uſed when the goods ſent on board a ſhip are but part of the cargo; for when a merchant loads a veſſel entirely on his own account, the deed paſſed between him and the maſter of the ſhip is called charter-party. See Charter-Party.

Bill *of Parcels*, an account given by the ſeller to the buyer, containing the particulars of all the ſorts and pieces of the goods bought.

Bill *of Sale* is when a man, wanting a ſum of money, delivers goods as a ſecurity to the lender, to whom he gives this bill, impowering him to ſell the goods, in caſe the ſum borrowed is not repaid with intereſt at the time appointed.

Bill *of Store*, a licence granted at the cuſtom-houſe to merchants, by which they have liberty to carry duty-free, all ſuch ſtores and proviſions as the ſhip's crew may have occaſion for during the voyage.

Bill *of Sufferance*, a licence granted to a merchant at the cuſtom-houſe, ſuffering him to trade from one Engliſh port to another, without paying cuſtom.

Bank Bill. See Bank.

Bill, in law, a ſecurity for money under the hand, and ſometimes the ſeal of the debtor. It is of two ſorts, a ſingle bill without or with a penalty; the latter is the ſame as a bond, except its being without a condition.

Bill alſo implies a declaration in writing, expreſſing either ſome wrong the complainant has ſuffered from the defendant, or a fault committed by the perſon complained of againſt ſome law or ſtatute.

This bill is ſometimes exhibited to juſtices at the general aſſizes, by way of indictment, or referred to others having juriſdiction; but is more generally addreſſed to the lord chancellor. It contains the fact complained of, the damage ſuſtained, and a petition or proceſs againſt the defendant for redreſs; and is uſed both in criminal and civil caſes. In the former, the words *billa vera* are indorſed by the grand jury upon a preſentment, implying that they find the ſame founded on probable evidence, and therefore worthy of further conſideration.

Bill *in Parliament*, ſignifies a paper containing propoſitions offered to the houſe to be paſſed by them, and afterwards to be preſented to the king in order to receive the royal aſſent, and become a law.

Bill *of Attainder*. See Attainder.
Bill *of Appeal*. See Appeal.
Bill *of Mortality*. See Mortality.

BILLET, in heraldry, a bearing in form of a long ſquare. They are ſuppoſed to repreſent pieces of cloth of gold or ſilver; but Guillim thinks they repreſent a letter ſealed up; and other authors take them for bricks

Billeté implies that the eſcutcheon is all over ſtrewed with billets, the number not aſcertained.

Billet-Wood, ſmall wood for fewel, cut three foot and four inches long, and ſeven inches and a half in compaſs; the aſſize of which is to be enquired of by juſtices.

BILLETING, in military affairs, is the quartering of ſoldiers in the houſes of a town or village. Among fox-hunters, it ſignifies the ordure and dung of a fox.

BILLON, in the hiſtory of coins, a compoſition of precious and baſe metals, where the latter predominate: wherefore gold, under twelve carats fine, is called billon of gold; and ſilver, under ſix penny-weight, billon of ſilver. So little attention was paid formerly to the purity of gold and ſilver, that the term billon of gold was applied only to that which was under twenty-one carats; and billon of ſilver to that which was lower than ten penny-weight.

BIMEDIAL. If two medial lines A B and B C (plate XXIII. *fig.* 9.) commenſurable in power only, are compounded, and contain a rational rectangle, the whole line A C is irrational, and called a firſt bimedial line. *Barrow's Euclid. Lib.* X. *Prop.* 38.

BINARY Arithmetic, that wherein unity or 1 and 0 are only uſed.

This was the invention of Mr. Leibnitz, who ſhews it to be very expeditious in diſcovering the properties of numbers, and in conſtructing tables: and Mr. Dangecourt, in the Hiſtory of the Royal Academy of Sciences, gives a ſpecimen of it concerning arithmetical progreſſionals; where he ſhews that, becauſe in binary arithmetic only two characters are uſed, therefore the laws of progreſſion may be more eaſily diſcovered by it than by common arithmetic.

The author, however, does not recommend this method for common uſe, becauſe of the great number of figures required to expreſs a number.

Binary Measure, in muſic, is a meaſure which is beaten equally, or where the time of riſing is equal to that of falling; uſually called common time.

BIND-WEED, *Convolvulus*, in botany; ſee Convolvulus.

BING, in the alum works, denotes a heap of alum thrown together in order to drain.

BINNACLE, in naval affairs, a wooden caſe ſtanding immediately before the helm or deck, and containing three diviſions, with a ſliding ſhutter to each; the middle of which is for a lamp or candle, and the two ſide ones for the ſea-compaſſes, by which the courſe is ſteered: there are always two on the quarter-deck of a ſhip of war, one being for the helmſman, and the other for the officer who conns or directs him. See Compass, Quarter-Master.

BINOCULAR *Teleſcope*. See Telescope.

BINOMIAL *Root*, in algebra, is a root conſiſting of two parts or members connected with the ſign +: thus $x+y$ is a binomial root, conſiſting of the ſum of thoſe two quantities.

Binomial *Theorem*, a general method for raiſing a given quantity to any given power, or extracting any given root thereof, invented by Sir Iſaac Newton, and is of the following form: $\overline{P+PQ}^{\frac{m}{n}} = P^{\frac{m}{n}} + \frac{m}{n}AQ + \frac{m-n}{2n}BQ + \frac{m-2n}{4n}CQ + \frac{m-3n}{4n}DQ +$ &c.

Where $P+PQ$ is the quantity whoſe root or any dimenſion, or root of the dimenſion, is to be found; that is, expreſſed by an infinite ſeries. P is the firſt term of that quantity; Q the remaining terms divided by the firſt; $\frac{m}{n}$ the index or exponent of the dimenſion $P+PQ$. Moreover, A, B, C, D, &c. are uſed for the terms found in the quotient, viz. A for the firſt term $P^{\frac{m}{n}}$; B for the ſecond $\frac{m}{n}AQ$; and ſo on.

A few examples will ſhew this excellent theorem's uſe.

Examp. 1. $\overline{a+x}^5$ is equal to $a^5 + 5a^4x + 10a^3x^2 + 10a^2x^3 + 5ax^4 + x^5$: for in this caſe, $P=a$, $Q=\frac{x}{a}$, $m=5$, $n=1$, $A=a^5$, $B=5a^4x$, $C=10a^3x^2$, $D=10a^2x^3$, $E=5ax^4$, $F=x^5$, and $G=0$.

Examp. 2. $\sqrt{aa+xx}$ or $\overline{aa+xx}^{\frac{1}{2}}$ is equal to $a + \frac{xx}{2a} - \frac{x^4}{8a^3} + \frac{x^6}{16a^5} - \frac{5x^8}{128a^7}$, &c. for here $P=aa$, $Q=\frac{xx}{aa}$, $m=1$, $n=2$, $A\left(=P^{\frac{m}{n}}=aa^{\frac{1}{2}}\right)=a$, $B=\frac{m}{n}AQ = \frac{xx}{2a}$. $\left(=\frac{m-n}{2n}BQ\right) = -\frac{x^4}{8a^3}$, &c.

Examp. 3. $\overline{a+x}^{\frac{4}{3}} = a^{\frac{4}{3}} + \frac{4xa^{\frac{1}{3}}}{3} + \frac{2x^2}{9a^{\frac{2}{3}}} - \frac{4x^3}{81a^{\frac{5}{3}}} +$, &c. for $P=a$, $Q=\frac{x}{a}$, $m=4$, $n=3$, $A\left(=P^{\frac{m}{n}}\right)=a^{\frac{4}{3}}$, &c.

Examp. 4. $\frac{1}{a+x}$ or $\overline{a+x}^{-1}$ or $\overline{a+x}^{\frac{1}{1}}$, is $= \frac{1}{a} - \frac{x}{a^2} + \frac{x^2}{a^3} - \frac{x^3}{a^4}$, &c. for in this caſe $P=a$, $Q=\frac{x}{a}$, $m=-1$, $n=1$, and $A\left(=P^{\frac{m}{n}}\right)=\frac{1}{a}$, $B\left(=\frac{m}{n}AQ = -1 \times \frac{1}{a}\right.$

$\times \frac{x}{a}\Big) = -\frac{x}{a^2}$, and $C = \frac{x^2}{a^3}$, $D = -\frac{x^3}{a^4}$, &c.

In the Philoſophical Tranſactions, N°. 230, Mr. De Moivre has given us the following theorem for raiſing an infinite ſeries to a given power *m*, or extracting the root thereof, viz. $\overline{az + bz^2 + cz^3 + dz^4 + ez^5 + fz^6, \&c.}^{\,m}$ will be $= a^m z^m + \frac{m}{1} a^{m-1} b z^{m+1}$

$$+\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}a^{m-2}b^2\\ +\frac{m}{1}a^{m-1}c\end{matrix}\right\} z^{m+2} + \left.\begin{matrix}\frac{m}{1}\times\frac{m-2}{2}\times\frac{m-3}{3}a^{m-3}b^3\\ \frac{m}{1}\times\frac{m-1}{2}a^{m-2}bc\\ \frac{m}{1}a^{m-1}d\end{matrix}\right\} z^{m+3}$$

$$+\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{4}a^{m-4}b^4\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{1}a^{m-3}b^2c\\ \frac{m}{1}\times\frac{m-1}{1}a^{m-2}bd\\ \frac{m}{1}\times\frac{m-1}{2}a^{m-2}c^2\\ \frac{m}{1}a^{m-1}e\end{matrix}\right\} z^{m+4}$$

$$+\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{4}\times\frac{m-4}{5}a^{m-5}b^5\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{1}a^{m-4}b^3c\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{1}a^{m-3}b^2d\\ \frac{m}{1}\times\frac{m-1}{1}\times\frac{m-2}{1}a^{m-3}bc^2\\ \frac{m}{1}\times\frac{m-1}{1}a^{m-2}be\\ \frac{m}{1}\times\frac{m-1}{1}a^{m-2}cd\\ \frac{m}{1}a^{m-1}f\end{matrix}\right\} z^{m+5}$$

$$+\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{4}\times\frac{m-4}{5}\times\frac{m-5}{6}a^{m-6}b^6\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{4}\times\frac{m-4}{1}a^{m-5}b^4c\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}\times\frac{m-3}{1}a^{m-4}b^3d\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{1}\times\frac{m-3}{2}a^{m-4}b^2c^2\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{1}a^{m-3}b^2e\\ \frac{m}{1}\times\frac{m-1}{1}\times\frac{m-2}{1}a^{m-3}bcd\\ \frac{m}{1}\times\frac{m-1}{1}a^{m-3}bf\\ \frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}a^{m-3}c^3\\ \frac{m}{1}\times\frac{m-1}{2}a^{m-2}ce\\ \frac{m}{1}\times\frac{m-1}{2}a^{m-2}d^2\\ \frac{m}{1}a^{m-1}g\end{matrix}\right\} z^{m+6} \ \&c.$$

For underſtanding of which, it is only neceſſary to conſider all the terms by which the ſame power of *z* is multiplied: in order to which, two things in each of theſe terms muſt be conſidered: 1°. The product of certain powers of the given quantities or coefficients *a*, *b*, *c*, *d*, &c. and 2°. The unciæ or products of $\frac{m}{1} \times \frac{m-1}{2}$, &c. prefixed to them.

Now to find all the products belonging to the ſame power of *z*. For example, to find that product whoſe index is $m+r$ (*r* being any whole number) the ſaid products muſt be diſtinguiſhed into ſeveral claſſes: thoſe which immediately after ſome certain power of *a*, (by which all theſe products begin) have *b*, are products of the firſt claſs; as $a^{m-4}b^3c$ is a product of the firſt claſs, becauſe *b* immediately follows a^{m-4}: thoſe which immediately after ſome power of *a* have *c*, are products of the ſecond claſs; ſo $a^{m-3}c^2d$ is a product of the ſecond claſs: thoſe which immediately after ſome power of *a* have *d*, are products of the third claſs; and ſo of the reſt.

This being underſtood, 1°. Multiply all the products belonging z^{m+r-1} (which immediately precedes z^{m+r}) by *b*, and divide them all by *a*, 2°. Multiply by *c*, and divide by *a*, all the products belonging to z^{m+r-2}. except thoſe of the firſt claſs, 3°. Multiply by *d*, and divide by *a*, all the products belonging to z^{m+r-3} except thoſe of the firſt and ſecond claſs, 4°. Multiply by *e*, and divide by *a*, all the terms belonging to z^{m+r-4}, except thoſe of the firſt, ſecond, and third claſs; and ſo on, till you meet twice with the ſame term. *Laſtly*, add the product of a^{m-r} into the letter whoſe exponent is $r+1$ to all thoſe terms.

Note, The exponent of a letter is the number expreſſing what place that letter has in the alphabet, as 3 is the exponent of the letter *c*.

By this rule it is manifeſt that it is eaſy to find all the products belouging to the ſeveral powers of *z*, if you have but the product belonging to z^m, viz. a^m.

Now, to find the unciæ prefixed to every product, you muſt conſider the ſum of the units contained in the exponents of the letters that compoſe it; (the index of *a* excepted) then write as many terms of the ſeries $m \times \overline{m-1} \times \overline{m-2} \times \overline{m-3}$, &c. as there are units in the ſum of the indexes; this ſeries is to be the numerator of a fraction, whoſe denominator is the product of the ſeveral ſeries $1 \times 2 \times 3 \times 4 \times 5$, &c. $1 \times 2 \times 3 \times 4 \times 5$, &c. $1 \times 2 \times 3 \times 4 \times 5 \times 6$, &c. the firſt of what contains as many terms as there are units in the index of *b*; the ſecond as many as there are units in the index of *c*; the third as many as there are units in the index of *d*, &c.

The demonſtration of this ſee in the above cited tranſaction.

Here follows an example or two of the uſe of this theorem.

Examp. 1. To raiſe this infinite ſeries $\frac{1}{x} + \frac{1}{x^2} + \frac{1}{x^3} + \frac{1}{x^4}$ &c. to the ſecond power, or to ſquare it.

In this caſe, in the theorem $m=2$, $z=x$, $a=\frac{1}{x^2}$, $b=\frac{1}{x^4}$, $c=\frac{1}{x^6}$, $d=\frac{1}{x^8}$, &c. therefore $\overline{\frac{1}{x}+\frac{1}{x^2}+\frac{1}{x^3}+\frac{1}{x^4}\ \&c.}^{\,2}$ will be $\frac{1}{x^2}+\frac{2}{x^3}+\frac{3}{x^4}+\frac{4}{x^5}$ &c. for the firſt term $a^m z^m$ $\left(=\frac{1}{x^4}\times x^2\right)$ is $\frac{1}{x^2}$. The ſecond term $\frac{m}{1}a^{m-1}bz^{m-1}$ $\left(=\frac{2}{x^2}\times\frac{1}{x^4}\times x^3\right)$ is $=\frac{2}{x^3}$. The third term

$$\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}a^{m-2}b^2\\ +\frac{m}{1}a^{m-1}c\end{matrix}\right\} z^{m+2} \left\{\begin{matrix}=2\times\frac{1}{2}\times\frac{1}{x^8}\times x^4=\frac{1}{x^4}+2\times\\ \frac{1}{x^2}\times\frac{1}{x^6}\times x^4=\frac{2}{x^4}\end{matrix}\right\} \text{is} = \frac{3}{x^4}.$$

The fourth term

$$\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}\times\frac{m-2}{3}a^{m-3}b^3\\ \frac{m}{1}\times\frac{m-1}{1}a^{m-2}bc\\ \frac{m}{1}a^{m-1}d\end{matrix}\right\} z^{m+3} \left\{ = \right.$$

$$\left.\begin{matrix}2\times\frac{1}{2}\times\frac{0}{3}\times x x\times\frac{1}{x^{12}}\times x^5=0\\ 2\times1\times1\times\frac{1}{x^4}\times\frac{1}{x^6}\times x^5=\frac{2}{x^5}\\ 2\times\frac{1}{x^2}\times\frac{1}{x^5}\times x^5=\frac{2}{x^5}\end{matrix}\right\} \text{is} = \frac{4}{x^5}$$

Examp. 2. To ſquare this infinite ſeries $1-x+x^2+x^3+x^4$, &c: In this caſe, in the theorem $m=2$, $z=x$, $a=\frac{1}{x}-1$, $b=1$, $c=-$, $d=1$, &c. and ſo $\overline{1-x+x^2+x^3+x^4}^{\,2}$ &c. will be $=1-2x+3x^2-4x^3+5x^4$, &c. for $a^m z^m$

$$\left(=\overline{\frac{1}{x}-1}^{\,2}\times x^2\right)=1-2x+xx.\ \frac{m}{1}\,a^{m-1}\,b\,z^{m+1}$$

$$\left(=\frac{2}{1}\times\overline{\frac{2}{x}\times-x^3}^{\,1}\right)=2xx-2x^3.$$

$$\left.\begin{matrix}\frac{m}{1}\times\frac{m-1}{2}a^{m-2}\,b^2\\ \frac{m}{1}a^{m-1}\,c\end{matrix}\right\}z^{m+3}\left\{\begin{matrix}=\frac{2}{1}\times\frac{1}{2}\times\overline{\frac{1}{x}-1}^{\,2-2}\times1\times x^4\\ \frac{2}{1}\times\overline{\frac{1}{x}-1}^{\,1}\times-1\times x^4\end{matrix}\right\}$$

$=-x^3+2x^4$, &c.

BIOGRAPHY, a very inſtructive ſpecies of hiſtory, containing the lives of remarkable perſons.

The word is formed from the Greek βιος, life, and γραφω, to deſcribe.

BIOUAC, in military affairs, a night guard performed by the whole army, when there is any apprehenſion of danger from the enemy.

BIQUADRATIC, the fourth power of any number or quantity.

Biquadratic Equation, in algebra, is an equation where the unknown quantity has four dimenſions. Thus, $x^4+ax^3+bx^2+cx+d=0$, is a biquadratic equation, becauſe the term x^4 is of four dimenſions. See Equation.

BIQUINTILE, an aſpect of the planets, when they are 144 degrees diſtant from each other.

BIRCH-TREE, in botany. See Betula.

BIRD, *Avis*, in zoology, one of the ſix general claſſes of animals, the characters of which are, that their body is covered with feathers, and that they have two wings, two legs, and a bill of a horny ſubſtance; the females likewiſe are all oviparous.

The knowlege of birds, of the orders and genera into which they are ſubdivided, and of their natures, uſes, figures, &c. conſtitutes a particular ſcience, under the name of ornithology.

Birds have been uſually divided into terreſtrial and aquatic, or land and water birds; but this ſubdiviſion is too general, as well as indeterminate: a much more certain diſtinction of birds is founded on the different ſhapes and ſtructure of their beaks, from which alone they are naturally arranged under the ſix following orders: 1. The *accipitres*, or thoſe which have the beak uncinated, or hooked. 2. The *picæ*, or thoſe with convex and compreſſed beaks. 3. The *anſeres*, or thoſe with dentated or ſerrated beaks. 4. The *ſcolopaces*, or thoſe furniſhed with ſubcylindric and obtuſe beaks. 5. The *gallinæ*, comprehending ſuch birds as have the beak of a conic form, but crooked, and the upper chap imbricated. 6. The *paſſeres*, or thoſe with conic and attenuated beaks.

We meet with ſeveral other diſtinctions of birds, taken from their manner of feeding; as carnivorous ones, or birds of prey; frugivorous and granivorous birds, or ſuch as feed on fruits, and the ſeeds of various plants; inſectivorous birds, or thoſe which feed principally on inſects: and ſo in other caſes.

As to the conſtituent parts of birds, it is remarkable, that the head is generally ſmall, in proportion to the reſt of the body; that the eyes are more plain and depreſſed than in quadrupeds; and that they have no external ear.

Birds, in heraldry, repreſent either the contemplative or active life, according as the different kinds are uſed. They are the emblems of liberty, expedition, readineſs, ſwiftneſs, and fear. They are more honourable bearings than fiſhes, becauſe they participate more of the air and fire, the two nobleſt elements, and, at the ſame time, higher than thoſe of earth and water.

Birds ſhould be borne in coat-armour in a manner ſuitable to their actions, as going, ſitting, ſtanding, flying, &c.

Birds that are either whole footed, or have their feet divided, and yet have no talons, are ſaid to be membered; but the cock, and all birds of prey with ſharp and hooked beaks and talons for encounter or defence, are termed armed. In the blazoning of birds, if their wings be not diſplayed, they are ſaid to be borne cloſe; as, he beareth an eagle, &c. cloſe.

Bird-Lime, a viſcid ſubſtance, prepared after different ways. The moſt common bird-lime among us is made from holly-bark, boiled ten or twelve hours; when the green coat being ſeparated from the bark, it is covered up a fortnight in a moiſt place, then pounded into a tough paſte, ſo that no fibres of the wood are diſcernible, and waſhed in a running ſtream till no motes appear, put up to ferment four or five days, ſkimmed as often as any thing ariſes, and laid up for uſe. To uſe it, a third part of nut-oil, or thin greaſe, muſt be incorporated with it over the fire.

The Italians make bird-lime of the berries of the miſleto-tree. That which comes from Damaſcus is ſuppoſed to be made of ſebeſtens: and it is ſaid that the bark of our *lantona*, or way-faring ſhrubs, will make very good bird-lime.

BIRTH, *Partus*, in midwifery, ſignifies the ſame with delivery. See the article Delivery.

An immature birth, or that which happens before the uſual time of pregnancy is completed, is otherwiſe called an abortion. See the article Abortion.

For the proportion of births to marriages, burials, &c. ſee the articles Marriages, Burial, &c.

After-Birth. See After-Birth.

Birth, in navigation, the ſituation in which a ſhip rides at anchor, or the diſtance between a ſhip and any adjacent object: as, ſhe lies in a good birth, i. e. is anchored in a convenient ſtation; give the land a good birth, i. e. keep at a proper diſtance from it. Birth alſo ſignifies the apartment in which any number of the officers or crew eat and ſleep: in a ſhip of war there is commonly one of theſe between every two guns.

BIRTHWORT, in botany, a plant with an irregular, tubulous, monopetalous flower. Three ſorts of this plant are kept in the ſhops, diſtinguiſhed by the epithets *round*, *long*, and *creeping*, from the different forms of the roots, the only parts uſed in medicine.

The roots of the round birthwort are pretty thick, unequal, full of round protuberances, ſometimes ſhaped like a kidney, externally brown, internally yellow like boxwood: thoſe of long birthwort are alſo brown on the outſide, and yellow within, near a foot in length, from two to three or four fingers in thickneſs, and full of wrinkles: thoſe of the creeping-rooted birthwort are the longeſt and ſlendereſt, and of the darkeſt brown colour on the outſide; the largeſt are ſcarce ſo thick as the little finger, and the greater number ſcarce half ſo thick.

In taſte they are all bitter and aſtringent, but in different degrees: the long is much the weakeſt, and the ſlender-rooted ſort the ſtrongeſt. Hence they differ alſo in medicinal virtue. Simon Paulli obſerves particularly of the long-rooted, that a decoction of it in the diſtilled waters of Veronica is of excellent ſervice againſt ulcerations on the ſhin-bone, and ſays he has received the thanks of many ſurgeons for the communication of this medicine.

With regard to their chemical analyſis, they all give out more to water than to ſpirit: an ounce yields with ſpirit ſomewhat more than a dram of reſinous extract, whilſt the ſame quantity, treated with water, gives upwards of two drams of a gummy one. The ſpirituous extract taſtes ſtrongly of the root; but the watery has very little taſte. In diſtillation, rectified ſpirit brings over nothing from the root; the diſtilled water has a diſagreeable ſmell, different from that of the birthwort itſelf.

It has been affirmed, that the fixed alcaline ſalt obtained from birthwort by burning, is of a peculiar kind; that it does not, like other fixed alcalies, throw down a yellow precipitate from ſolution of mercury ſublimate. Tournefort mentions this particularity of the ſlender-rooted ſort, and ſays he took it from the experiments upon the regiſters of the French academy. But experience has demonſtrated, that the ſmalleſt portion of the ſalt of birthwort, added to a ſolution of ſublimate, throws down a yellow precipitate equally with the alcaline ſalts of other plants.

BIS, in botany, a name given by the ancients to two different genuſes of plants, now called monkſhood and hemlock.

Bis annual, an appellation given to ſuch plants as do not flower till the ſecond year.

BISHOP, a prelate, or perſon conſecrated for the ſpiritual government of a dioceſe.

A biſhop is the higheſt eccleſiaſtical dignitary, the chief officer in the hierarchy or œconomy of church government. The apoſtles, after our Saviour's aſcenſion, went forth preaching the goſpel in the particular provinces allotted to them, and appointed the firſt converts of every place through which they paſſed, or, as Clemens Romanus expreſſes it, “ the firſt fruits of their “ miniſtry,” to be the biſhops and deacons of the churches planted by them. Thus Tertullian ſays, Clemens was ordained biſhop of Rome by St. Peter, and Polycarp biſhop of Smyrna by St. John.

There appears to have been but one biſhop in a church; the titles of which ſupreme officer are reckoned up by Cyprian, and are, biſhop, preſident, paſtor, governor, ſuperintendant, and prieſt. He is likewiſe called in the Revelations the angel of his church, according to Origen and others; an appellation which denotes both his authority and his office, his power and his duty.

And as there was but one biſhop to a church, ſo there was but one church to a biſhop, as appears from hence, that the ancient dioceſes are never ſaid to contain churches in the plural, but only a church in the ſingular: for authors ſpeak of the church of Corinth, the church of Smyrna, the church of Philadelphia, the church of Antioch, &c. The word dioceſe, by which a biſhop's flock is now uſually expreſſed, is never uſed in that ſenſe by the writers of the three firſt centuries; but the biſhop's cure is frequently denoted by the word παροικια, pariſh; as appears from the ſynodical Epiſtle of Irenæus to pope Victor, and from numberleſs places of Euſebius's Eccleſiaſtical Hiſtory, which ſpeak of the biſhops of the pariſh of Alexandria, of the pariſh of Epheſus, of the pariſh of Corinth, of the pariſh of Athens, of the pariſh of Carthage, &c. denoting the very ſame thing which we now mean by the word pariſh, viz. a competent number of Chriſtians, dwelling near together, having one biſhop, or paſtor, ſet over them.

The peculiar acts of the epiſcopal function were, preaching the word, praying with his people, adminiſtering the two ſacraments of baptiſm and the euchariſt, taking care of the poor, ordaining of miniſters, governing his flock, excommunicating offenders, and abſolving of penitents. To the conſtant diſcharge of theſe offices the primitive biſhops ſedulouſly applied themſelves; to which purpoſe they reſided conſtantly on their cures: and reſidence on their pariſhes was deemed ſo neceſſary, that Cyprian, enumerating the ſins which brought the wrath of God on the churches, in the bloody perſecution of Decius, mentions the non-reſidence of the biſhops as one.

The election of a biſhop was jointly in the hands of the clergy and laity of the biſhopric or pariſh which became vacant; and Cyprian frequently acknowledges, that he was promoted to that honourable charge by the ſuffrage of the people. When they had elected a biſhop, they preſented him to the neighbouring biſhops for their approbation and conſent, without which his election was not valid. Sometimes the choice of a biſhop was transferred, by conſent of the people, to the neighbouring biſhops; a cuſtom which generally prevailed in the dioceſes of Africa. A biſhop, when elected, was ordained or inſtalled in his own church by the neighbouring biſhops. That three were ſufficient for the purpoſe, appears from hence, that Novation, when he ſchiſmatically aſpired to the ſee of Rome, that his ordination might appear canonical, wheedled three ignorant and ſimple biſhops to come to Rome, and inſtal him by impoſition of hands. A biſhop, thus choſen and ordained, always gave notice of his advancement to the moſt renowned biſhops of the church.

The earlieſt account we have of Britiſh biſhops is carried up no higher than the council of Arles, aſſembled by the emperor Conſtantine, in the fourth century; at which were preſent the biſhops of London, York, and Caerleon.

Before the Norman Conqueſt, biſhops were choſen by the chapters, whether monks or prebendaries. From the Conqueror's time to the reign of king John, it was the cuſtom to chooſe biſhops at a public meeting of the biſhops and barons, the king himſelf being preſent at the ſolemnity, who claimed a right of inveſting the biſhops, by delivering to them the ring and paſtoral ſtaff. It is true, the popes endeavoured to gain the election of biſhops to themſelves; and this occaſioned great ſtruggles and conteſts between the Roman pontiffs and our kings. At length, after various diſputes between king John and the pope, the former, by his charter A. D. 1215, granted the right of election to the cathedral churches. A ſtatute in the reign of Henry VIII. ſettles the election of biſhops as follows: “ The king, upon the vacancy “ of the ſee, was to ſend his *conge d'eſlire* to the dean and “ chapter, or prior and convent, and in caſe they de“ layed the election above twelve days, the crown was “ impowered to nominate the perſon by letters patent. “ And after the biſhop thus elected had taken an oath “ of fealty to the king, his majeſty, by his letters pa“ tent under the broad ſeal, ſignified the election to the “ archbiſhop, with orders to confirm it, and conſecrate “ the elect. And laſtly, if the perſons aſſigned to elect “ and conſecrate deferred the performing their reſpective “ offices twenty days, they were to incur a præmunire.” But a ſtatute of Edward VI. made a change in the manner of electing biſhops, and transferred the choice wholly from the deans and chapters to the crown. The preamble in the firſt place alledges the inconveniences of the former manner of electing, from the circumſtances of delay and expence: after which it is ſaid in the preamble, “ That the ſaid elections are in very deed no “ elections, but only, by a writ of *conge d'eſlire*, have “ colours, ſhadows, and pretences of election; that “ they ſerve to no purpoſe, and ſeem derogatory and “ prejudicial to the king's prerogative royal, to whom “ only appertains the collation and gift of all archbi“ ſhoprics and biſhoprics, and ſuffragan biſhops, within “ his highneſs's dominions.”

This ſtatute therefore enacts, that “ For the future no “ *conge d'eſlire* ſhall be granted, nor any election be made “ by the dean and chapter, but that the archbiſhopric “ or biſhopric ſhall be conferred by the king's nomina“ tion in his letters patents.” But this alteration made by the ſtatute of king Edward is no longer in force; and the cuſtom of ſending down the *conge d'eſlire* is reſtored.

Upon the vacancy of a biſhop's ſee, the king grants a licence, or *conge d'eſlire*, under the great ſeal, to the dean and chapter, to elect the perſon whom by his letters miſſive he hath appointed; and they are to chooſe no other. The dean and chapter having made their election accordingly, certify it under their common ſeal to the king, and to the archbiſhop of the province, and to the biſhop thus elected: then the king gives his royal aſſent, under the great ſeal, directed to the archbiſhop, commanding him to confirm and conſecrate the biſhop thus elected. The archbiſhop then ſubſcribes his *fiat confirmatio*, and grants a commiſſion to the vicar-general to perform all the acts requiſite thereto: who thereupon iſſues out a ſummons to all perſons who may object to the election, to appear, &c. which citation is affixed on the door of Bow-church. At the time and place appointed, the proctor for the dean and chapter exhibits the royal aſſent, and the commiſſion of the archbiſhop, which are both read, and accepted by the vicar-general. Then the new biſhop is preſented by the proctor of the vicar-general; and three proclamations being made for the oppoſers of the election to appear, and none appearing, the vicar-general confirms and ratifies the choice of the perſon elected; who takes the oaths of ſupremacy, canonical obedience, and that againſt ſimony.

Till this act of confirmation is performed, the biſhop elect may be rejected, becauſe there may be reaſons aſſigned why he ſhould not be made a biſhop; which is the reaſon of the above-mentioned citations and proclamations.

After confirmation, the next thing to be done is conſecration; which the archbiſhop performs by the impoſition of hands and prayer, according to the form laid down in the common-prayer-book: which done, the biſhop is complete, as well in relation to ſpiritualities as temporalities. Juſtice Doderidge, in his argument of Evans and Aſcue's caſe, ſays, there is a ſpiritual marriage between the biſhop and his church, which is begun by election, contracted by confirmation, and conſummated by conſecration.

A biſhop of England is a peer of the realm, and, as ſuch, ſits and votes in the houſe of lords. He is a baron in a threefold manner, viz. feudal, in regard of the temporalities annexed to his biſhopric; by writ, as being ſummoned by writ to parliament; and by patent and creation. Accordingly he has the precedence of all other barons, and votes both as baron and biſhop. But though their peerage never was denied, it has been conteſted, whether the biſhop has a right to vote in criminal matters. This right was diſputed as early as the reign of Henry II. and we find this deciſion of the controverſy: *Archiepiſcopi, epiſcopi, &c. ſicut cæteri barones, &c.* i. e. Archbiſhops, biſhops, &c. in like manner as the reſt of the barons, ought to be preſent at the judgments in the king's courts, until it come to diminution of members, or to death. The reaſon which the canoniſts give, why biſhops ſhould not be preſent in caſes of blood, is, becauſe they contract an irregularity thereby, *ex defectu lenitatis.* Yet archbiſhop Cranmer, being one of the privy-council to Edward VI. ſigned the warrant for the execution of Thomas Seymour, lord-high-admiral of England; and the archbiſhop of Canterbury was the firſt in commiſſion at the trial of Mary Queen of Scots. And in the earl of Strafford's caſe, in the reign of Charles I. when Williams, archbiſhop of York, declared his opinion, that the biſhops ought not to be preſent at the paſſing of the act of attainder, it was looked upon as betraying a fundamental right of the whole order. At preſent the biſhops have their vote in the trial and arraignment of a peer; but before ſentence of death is paſſed, they withdraw, and vote by their proxy.

The juriſdiction of a biſhop, in England, conſiſts in collating to benefices; granting inſtitutions on the preſentation of other patrons; commanding induction; taking care of the profits of vacant benefices for the uſe of the ſucceſſors; viſiting his dioceſe once in three years; in ſuſpending, depriving, degrading, and excommunicating; in granting adminiſtrations, and taking care of the probate of wills: theſe parts of his function depend on the eccleſiaſtical law. By the common law, he is to certify the judges touching legitimate and illegitimate births and marriages. And to his juriſdiction, by the ſtatute law, belongs the licenſing of phyſicians, ſurgeons, and ſchool-maſters; and the uniting ſmall pariſhes; which laſt privilege is now peculiar to the biſhop of Norwich.

Bishop's-Court, an eccleſiaſtical court, held in the cathedral of each dioceſe by the biſhop's chancellor, who judges by the civil and canon law; and if the dioceſe be large, he has commiſſaries in remote parts, who hold what they call conſiſtory courts, for matters limited to them by their commiſſion.

BISHOPING, a term among horſe-dealers, to denote the ſeveral artifices uſed by them on an old or bad horſe, to conceal his natural defects, and impoſe upon the buyer.

BISHOPRIC, a dioceſe, or the diſtrict over which a biſhop's juriſdiction extends.

BISKET, or Biscuit, a general name for the bread uſed in the ſea-ſervice, eſpecially in long voyages.

Biſket, in order to be good, ſhould be made ſix months before it is put on board a ſhip; it ſhould alſo be made of good wheat flour, thoroughly cleaned from the bran.

Manner of making Sea-Biſket. The flour is firſt wet in the kneading-trough, with a ſufficient quantity of water, and covered for ſome time with a cloth. It is then well kneaded with a brake, and the dough divided into pieces of about three ounces each. Theſe pieces are again kneaded ſingly, and laid in rows, and the baker, after ſhaking ſome flour over them, lays another row upon the former; and continues kneading and placing his pieces of dough upon the laſt pieces, till the whole batch, or quantity baked at once, is finiſhed: the pieces of dough are then flatted into cakes, pricked with an inſtrument for that purpoſe, and placed regularly in the oven, where they ſtand about half an hour, when they are taken out of the oven, and carried to the ſtore-room.

The oven is ſufficiently heated while the dough is kneading and forming into cakes, ſo that there is no loſs of time during the whole day. Five perſons are ſufficient for two ovens, two of which are the maſter-bakers, which have each a mate, the fifth perſon being called the idle-man. The maſter-bakers aſſiſt in kneading the dough, and flattening it into cakes, and ſet the biſkets in the ovens. The mates alſo aſſiſt in kneading the dough, flattening it into cakes, heating the oven, and toſſing the cakes into it. The laſt operation they perform with great dexterity, the maſter-baker conſtantly catching the cake on his peel, and placing it regularly in the oven. The idle-man fetches in the wood, wets and kneads the flour in the kneading-trough, takes it thence, and kneads it with the brake, carries it into the bake-houſe, pricks the cakes, and carries them to a ſmall table placed at the oven's mouth, whence the mate takes them, and toſſes them into the oven.

Bisket, among confectioners, ſignifies a kind of bread made of fine flour, eggs and ſugar, with the addition of roſe or orange-flower-water. Sometimes aniſeeds, carraway ſeeds, preſerved orange, citron, or lemon peel, are added, and the different compoſitions diſtinguiſhed by different names, as ſeed-biſket, long-biſket, round-biſket, Naples-biſket, ſpunge-biſket, &c.

BISMUTH, or Tin-Glass, in natural hiſtory, a ſparkling white ſemi-metal, very ponderous, conſiderably hard and ſonorous, extremely brittle, without any degree of malleability, falling in pieces under the hammer, and reducible by triture into fine powder. When broke, the ſurface of the fracture appears compoſed of bright plates or flakes, larger than thoſe of the other ſemi-metals. In its external appearance, it has a great reſemblance to regulus of antimony and zinc, differing little otherwiſe than in the largeneſs of the plates, and in its contracting a yellowiſh caſt on the ſurface expoſed to the air. In its intrinſic properties, it is extremely different; melting far more eaſily, not evaporating ſo readily, being differently acted upon by acids, producing different effects upon other metallic bodies, &c.

Biſmuth melts in the fire long before it grows red-hot, conſiderably ſooner even than lead. Kept in fuſion, and ſtirred, it ſoon calcines; gaining at the ſame time an increaſe in its weight, of near half an ounce upon a pound. The calx melts, upon raiſing the fire a little, into a browniſh or yellowiſh glaſs; which promotes the vitrification of earths and the refractory metallic calces more powerfully, and corrodes and ſinks through the common crucibles more readily than glaſs of lead itſelf. If biſmuth be mixed with gold or ſilver, a heat that is but juſt ſufficient to melt the mixture, will preſently vitrify a part of the biſmuth, which then having no action on thoſe perfect metals, ſeparates and glazes the crucible all round.

Calx of biſmuth, long reverberated, does not, as ſome pretend, become red as the calces of lead. It ſcarcely retains even the form of a calx, a part of the biſmuth being revived into its metallic appearance by the flame: none of the deſtructible metallic bodies is ſo eaſy of revival as this ſemi-metal. If the veſſel is covered, and all inflammable matters excluded, vitrification is the only change that enſues.

The nitrous acid diſſolves biſmuth with great effervеſcence, and a copious diſcharge of yellow corroſive fumes. The ſolution, if the biſmuth has not been too haſtily added to the acid, proves colourleſs and tranſparent: diluted with a large quantity of water, it becomes milky, and depoſites, on ſtanding, a fine white precipitate, or magiſtery; which edulcorated by repeated effuſions of water, is employed as a coſmetic, both in waſhes and pomatums, under the name of Spaniſh or pearl white.

Magiſtery of Bismuth. There are ſundry variations in preparing this magiſtery. Some take aqua regia for the menſtruum; and for the precipitant, a ſolution of ſea-ſalt, alcalies, ſpirit of wine, &c. Some mix with the ſolution of biſmuth, a ſolution of benzoin in ſpirit of wine, and thus obtain a magiſtery compoſed of calx of biſmuth and benzoin. Others add a ſolution of chalk to the metalline ſolution, and precipitate both together with alcalies. I have made trial with a good number of different precipitants, and found, that with common fixed alcali, and cauſtic alcali, with watery and vinous alcaline ſpirits, the magiſtery was white, and in conſiderable quantity; the liquor, after precipitation with volatile ſpirits, appearing blue: that oil of vitriol threw down a white precipitate very copiouſly; but that with ſpirit of vitriol, ſpirit of ſalt, and weak ſpirit of nitre, the precipitate was in very ſmall quantity, in colour white like the foregoing; and that diſtilled vinegar made no precipitation at all: that common rectified ſpirit of wine and tartarized ſpirit, common water and lime-water, gave white precipitates: that ſolutions of nitre, vitriolated tartar, ſal mirabile, alum, borax, common ſalt, ſal ammoniac, the combination of calcareous earth with marine acid, called fixed ſal ammoniac, and the terra foliata tartari, all precipitated the biſmuth white: that with a ſolution of gold in common aqua regia, the magiſtery proved grey; with a ſolution of the ſame metal in an aqua regia made with ſpirit of ſalt, it was likewiſe grey, but in much leſs quantity; with ſolution of copper in aqua fortis, white, and in very ſmall quantity, the liquor continuing blue; with ſolution of vitriol of copper, white; with ſolution of mercury ſublimate, white and plentiful; with ſolution of iron in aqua fortis, yellowiſh; with ſolution of lead in aqua fortis, and of ſugar of lead, white; with ſolution of zinc in aqua fortis there was a little precipitate; and with ſolutions of ſilver, of tin, of regulus of antimony, and of mercury, in the ſame acid, none at all. On boiling ſome powdered biſmuth in a ſolution of green vitriol, the liquor did not grow turbid, as it would have done by itſelf, but rather clearer and clearer: a fixed alcaline lixivium being afterwards added, it turned white and thick; but on ſtanding for ſome time, depoſited a greeniſh matter, which, on drying, changed to a light brown: a little of the liquor evaporated and ſet to ſhoot, yielded cryſtals, which in appearance and taſte reſembled vitriol of iron.

Some prepare the magiſtery of biſmuth, by ſubliming the powdered biſmuth with ſal ammoniac, diſſolving the flowers in diſtilled water, and then precipitating with volatile or fixed alcali: others add nitre in the ſublimation, but this addition rather injures than improves the colour of the product: and indeed the ſublimates obtained by either method are leſs fit for making the magiſtery than biſmuth in ſubſtance; for the ſolution of them, whatever care is taken in the operation, will not be limpid, but green. Some, inſtead of the magiſtery, direct a calx to be made by deflagrating the biſmuth with nitre, expecting that the biſmuth will detonate like antimony, and that the calx will reſemble that of antimony prepared in the ſame manner: others direct the flowers which ariſe during the deflagration, to be caught in aludels for the ſame purpoſes. But biſmuth, though it is very readily calcined by nitre, does not ſenſibly deflagrate with it: the flowers and the calx are not perfectly white, but yellowiſh; and the quantity of the flowers is ſmall, only two ounces having been obtained from ſixteen.

The magiſtery of biſmuth appears to have ſome latent corroſive quality; and when freely uſed as a fucus, not to be entirely innocent: it gradually impairs the natural complexion, and leaves, for old age, a coarſe and diſagreeable ſkin. The peruke-makers are ſaid to employ it in their pomatums, for giving a whiteneſs to grey, reddiſh, yellow, or other coloured hair; and Pomet obſerves, that a ſhower of rain will waſh off this adventitious whiteneſs. I have been informed alſo, that thoſe who bleach hair in England make uſe of this magiſtery; and therefore I determined to examine by experiment its effects upon hair. Experiment ſatisfied me that the report was groundleſs; that the magiſtery of biſmuth does not whiten hair, but darken it; that it changes the whiteſt flaxen hair firſt to a yellowiſh, then to a yellowiſh brown, afterwards to a dark brown, and at laſt to a black. The trial may be made in two ways; by boiling the hair in water along with the magiſtery; or by applying the magiſtery mixed with pomatum, and hanging the hair in the ſun: the oftener this is repeated, the darker will the colour be. We may judge from hence, that this magiſtery is leſs fit for the purpoſes of a coſmetic, than it is generally ſuppoſed to be. The magiſtery itſelf has been commonly believed to change its colour in the ſun, and hence it is directed to be dried cautiouſly in a ſhady place; but it did not appear to have ſuffered any conſiderable alteration in being expoſed to the ſun for two months. It is apt, however, in length of time, to turn yellowiſh; and hence a large ſtock ſhould not be prepared at once. *Neumann's Chemiſtry.*

BISNOW, or Bischnou, a ſect of the Banians in the Eaſt-Indies, who live wholly on herbs, pulſe, butter, and milk. They ſing hymns in honour of their god, whom they call Ram-ram, and mix their devotions with dances and the ſounds of muſical inſtruments.

BISSECTION, in geometry, the dividing a line, angle, &c. into two equal parts.

BISSEXTILE, in chronology, a year conſiſting of 366 days, being the ſame with our leap-year. The day alſo which is this year added, is called biſſextile.

The true ſolar year, or that ſpace of time which flows while the ſun is moving from any one point of the ecliptic till he returns again to the ſame point, conſiſts of 365 days, 5 hours, 48 minutes, 57 ſeconds. But the year made uſe of by the ancient Egyptians, conſiſted of 365 days only, which being about ſix hours leſs than the true ſolar year, they loſt a day nearly every four years. This inconveniency did not eſcape the obſervation of Julius Cæſar, who being then high-prieſt among the Romans, ordered that every fourth year ſhould have an additional or intercalary day; and that the ſixth of the calends of March ſhould be that year reckoned twice: and hence both the intercalary day, and the year when it happened, were called biſſextile. This method of computation is called the Julian account, or Old Style.

But as the true ſolar year conſiſts of 365 days, 5 hours, 49 minutes nearly, it follows that, according to this way of reckoning, the civil year will, at the end of every four years, begin 44 minutes ſooner than it did before, and conſequently it will, in 331 years, anticipate one whole day. This induced pope Gregory XIII. in the year 1582, to attempt a reformation of the calendar; and finding that the equinox had then anticipated, ſince the Nicene council held in the year 325, ten whole days, he ordered that theſe ten days ſhould that year be taken out of the calendar, and that the 11th of March ſhould be called the 21ſt. He alſo ordered, that every hundredth year, which according to the Julian form was to be biſſextile, ſhould be a common year, conſiſting of 365 days only: but becauſe this was too much, every four hundredth year was to remain biſſextile. This method of computation is called the Gregorian account, or New Style; and was immediately followed in moſt foreign countries. Great Britain however ſtill followed the Old Style, till the year 1752, during which interval one day more was anticipated. It was therefore ordered, by act of parliament, that eleven days ſhould that year be taken out of the calendar, and that the natural day following the ſecond of September, ſhould be called the fourteenth, omitting the intermediate eleven days; and that the New Style ſhould for the future be obſerved. By this correction the feaſts and faſts of the church are now kept according to the original deciſion of the council of Nice.

BISTER, or rather Bistre. See Bistre.

BISTORTA, biſtort or ſuckeweed, in botany, a plant with oval, pointed, wrinkled leaves, of a dark green colour above, and bluiſh underneath, ſtanding on long pedicles, and continued a little way down the pedicle, forming a narrow margin on each ſide; among theſe ariſe round, ſlender, jointed, unbranched ſtalks, furniſhed with ſmaller and narrower leaves, which have no pedicles; bearing on the top ſpikes of imperfect five-leaved red flowers, which are followed by triangular ſeeds. It is perennial, and grows wild in moiſt meadows in ſeveral parts of England.

The root of this plant is bent and jointed, commonly about the thickneſs of the finger, ſurrounded with buſhy fibres, of a blackiſh brown colour on the outſide, and reddiſh within: it is diſtinguiſhed from the roots of the other biſtorts, by being leſs bent; that of the officinal ſpecies having only one or two bendings, and thoſe of the others three or more.

This root has a ſtrong aſtringent taſte, without any manifeſt ſmell or particular flavour. It is one of the ſtrongeſt of the vegetable ſtyptics, and frequently made uſe of as ſuch, in diſorders proceeding from a laxity or debility of the ſolids, for reſtraining alvine fluxes, after due evacuations, and other preternatural diſcharges, both ſerous and ſanguineous. It has been ſometimes given in intermitting fevers; and ſometimes alſo in ſmall doſes, as a corroborant and antiſeptic, in acute, malignant, and colliquative fevers; in which intentions, Peruvian bark has now deſervedly ſuperſeded both this and all the other aſtringents.

The common doſe of biſtort root, in ſubſtance, is fifteen or twenty grains: in urgent caſes, it is extended to a dram. Its aſtringent matter is totally diſſolved both by water and rectified ſpirit; the root, after the action of a ſufficient quantity of either menſtruum, remaining inſipid: the watery tinctures are of a dark browniſh colour, the ſpirituous of a browniſh red. On inſpiſſating the tinctures, the water and ſpirit ariſe unflavoured, leaving extracts of intenſe ſtypticity.

BISTOURY, in ſurgery, an inſtrument for making inciſions, of which there are different kinds, ſome being of the form of a lancet, others ſtraight and fixed in the handle like a knife, and others crooked with the ſharp edge on the inſide.

BISTRE, among painters, ſignifies the burnt oil extracted from the ſoot of wood.

It is of a brown tranſparent colour, having much the ſame effect in water-painting, where alone it is uſed, as brown pink in oil. Though this colour is extremely ſerviceable in water colours, and much valued by thoſe who know and can procure it, yet it is not in general uſe here, perhaps on account of its not being eaſily procured of a perfect kind; hardly any of it being good, except that imported from France. Perhaps the principal reaſon for this is, that dry beech-wood affords the beſt ſoot for making it; and it is not eaſy to procure ſuch here without mixture of the ſoot of green wood, or other combuſtibles that deprave it for this purpoſe; or it is poſſible that they who have pretended to prepare it, have been ignorant of the proper means; there not being any recipe or directions in books that treat of theſe matters, from whence they could learn the proper proceſs.

Biſtre may, however, be prepared with great eaſe in the following manner.

Take any quantity of ſoot of dry wood, but let it be of beech wherever that can be procured. Put it into water in the proportion of two pounds to a gallon; and boil them half an hour: then, after the fluid has ſtood ſome little time to ſettle, but while yet hot, pour off the clearer part from the earthy ſediment at the bottom; and if on ſtanding longer it forms another earthy ſediment, repeat the ſame method, but this ſhould be done only while the fluid remains hot: evaporate then the fluid to dryneſs; and what remains will be good biſtre, if the ſoot was of a proper kind.

The goodneſs of biſtre may be perceived by its warm deep brown colour, and tranſparency when moiſtened with water.

BIT, or Bitt, an eſſential part of a bridle. Its kinds are various: 1. The muſrol, ſnaffle, or watering bit. 2. The canon mouth, jointed in the middle. 3. The canon with a faſt mouth, all of a piece, only kneed in the middle, to form a liberty or ſpace for the tongue; fit for horſes too ſenſible, or ticklish, and liable to be continually bearing on the hand. 4. The canon mouth, with the liberty in form of a pigeon's neck; proper where a horſe has too large a tongue. 5. The canon with a port mouth, and an upſet or mounting liberty; uſed where a horſe has a good mouth but large tongue. 6. The ſnatch mouth, with an upſet; ruder but more ſecure than a canon mouth. 7. The canon mouth with a liberty; proper for a horſe with a large tongue, and round bars. 8. The maſticadour, or ſlavering-bit, &c. The ſeveral parts of a ſnaffle, or curb-bit, are the mouth-piece, the cheek and eyes, guard of the cheek, head of the cheeks, the port, the welts, the campanel or curb and hook, the boſſes, the bolſters and rabbets, the water-chains, the ſide-bolts, bolts and rings, kirbles of the bit or curb, trench, toprol, flap, and jeive.

Bit alſo denotes the iron part of a piercer, augre, and the like inſtruments.

Bit *of a Key*, the part which contains the wards. See Wards.

Bits, in naval architecture, ſtrong pieces of ſquare timber let down through, and fixed in holes of, the decks above and below, called mortiſes, and bolted to the beams. There are ſeveral bits in a ſhip, the principal of which are thoſe for the cable, whoſe upper-parts commonly reach about three or four feet above the deck over which the cable paſſes: they are ſupported on the forepart by ſtrong knees bolted to the deck, and fortified by a croſs-piece of equal thickneſs with themſelves, which is bolted and forelocked to the bits. The ends of the croſs-piece reaches about two or three feet beyond the bits, and is fixed about two feet below their upper-ends; around theſe the cable is gradually veered away, without which it would almoſt be impoſſible to prevent it from running out to the end when the ſhip rides a great ſtrain, which is always the caſe in a ſtorm or in a rapid tide. In ſhips of war there are commonly two pair of cable bits; and when they are both uſed at once, the cable is ſaid to be double-bitted. See *Freſhen the* Hawse, Service. To bit the cable is to put the double part or bight of it round the bits. The other bits are of a ſmaller kind for faſtening the topſail-ſheets. See Quarter-Block.

BITTER, *Amarus*, an epithet given to all bodies of an oppoſite taſte to ſweetneſs.

Bitters are accounted ſtomachic and cleanſing, and are ſaid to reſiſt putrefaction, correct acidities, and aſſiſt digeſtion; though there are not wanting ſome who will have them to be hurtful to the ſtomach, except in ſo far as their aſtringency contributes to brace the fibres.

Bitter-Apple, in botany, a name given to the colocynthis. See Colocynthis.

BITTERN, in ornithology, the name of a bird of the heron kind, called by authors, ardea ſtellaris; and by ſome taurus, botaurus, butorius, and ocnus.

In Engliſh, the butter-bump, and mire-drum. It is nearly of the ſize of a common heron; its head is ſmall and narrow; its crown is black; and there is alſo a black ſpot on each ſide, near the angle of the mouth. Its throat and ſides are reddiſh, variegated with black tranſverſe lines; the neck is covered with very long feathers, which make it appear much thicker and ſhorter than it really is; its belly is of a duſky white, with a caſt of browniſh red, and its back is variegated with a pale reddiſh brown and black. It makes a very remarkable noiſe, which it repeats either three or five times. It is heard only in the building-time, which begins in February. The common people, from the ſingularity of the noiſe, think the bird, in order to make it, ſticks its beak in a reed, or in the mud. It is commonly found in ſedgy and reedy places, near the waters, and ſometimes in hedges. Towards autumn this bird flies very high in an evening after ſun-ſet, riſing with a ſpiral aſcent, till quite out of ſight; and as they riſe, they make an odd noiſe, not at all like their uſual note. This they repeat alſo very often, as they are on the wing in the night; and hence they are called by ſome, though improperly, the night-raven. It builds on the ground, and lays five or ſix eggs, which are roundiſh, and of a greeniſh white. When wounded, and going to be taken, it ſtrikes at the perſon's eye, and ought therefore to be carefully guarded againſt.

Bittern, in the ſalt-works, a liquor left after the boiling and cryſtallizing of the ſalt, of a nauſeous bitter taſte. It remains in the pans after the boiling is finiſhed, and is thence conveyed to a pit without the works, and at proper ſeaſons, with a ſmall addition of oil of vitriol, boiled into what is improperly called Epſom ſalt. The factitious ſal mirabile is made at the ſalt works from the ſalt that ſhoots ſpontaneouſly from the bittern.

BLACK, a well known colour, ſuppoſed to be owing to the abſence of light; and the rays thereof being imbibed by the black bodies. See Colour and Light.

Black bodies are not only warmer, but more inflammable than others, as is proved by various experiments; for which the curious may conſult Boyle, 'S Graveſande, and other philoſophers who have treated of this ſubject.

BLACK, among dyers, one of the five ſimple and mother colours uſed in dying. It is made differently, according to the ſeveral qualities of the ſtuffs that are to be dyed. For ſtuffs of a high price, as woollen cloth, an ell and a half or an ell and a quarter wide, broad and narrow ratteens, fine woollen druggets, &c. they muſt uſe a black made of the beſt woad and indigo, inclining to a bluiſh brown. The goodneſs of the compoſition conſiſts in there being not above ſix pounds of indigo ready prepared to each ball of woad, when the latter, being in the tub, begins to caſt its blue flower; and in not being heated for uſe above twice; after which it muſt be boiled with alum, tartar, or aſhes of lees of wine; then maddered with common madder; and laſtly, the black muſt be given with gall-nuts of Aleppo, copperas, and ſumach. As for more indifferent ſtuffs, ſuch as ſmall ratteens and ſhalloons, as they cannot pay for the expence of maddering, it is ſufficient that they be well boiled with woad, and afterwards blacked with gall and copperas. There is likewiſe the Jeſuit's black, which is made with the ſame ingredients as the good black, but without having firſt dyed the ſtuff blue.

German **BLACK**, called by ſome Frankfort black, is made of the lees of wine, burnt, waſhed afterwards in water, then ground in mills made for that purpoſe, with ivory, bones, or peach-ſtones, alſo burnt. It comes from Frankfort, Mentz, and Straſbourg, either in lumps or powder, and muſt be choſen moiſt, without having been wetted, of a fine ſhining black, ſoft, friable, light, and with as few ſhining grains as poſſible.

Bone-**BLACK** is made with the bones of oxen, cows, &c. and is uſed in painting; but is not ſo much eſteemed as ivory-black.

Hart's **BLACK**, that which remains in the retort after the ſpirits, volatile ſalt, and oil, have been extracted from hart's-horn. It anſwers the purpoſes of painters almoſt as well as ivory-black.

Spaniſh **BLACK** is nothing but burnt cork; it is uſed in ſeveral works. It ſhould be light, and have as few grains of ſand mixed with it as poſſible.

Earth-**BLACK**, a ſort of coals found in the ground, which the painters and limners uſe to paint in freſco, after it has been well ground.

There is alſo a black made with gall-nuts, copperas, or vitriol, ſuch as common ink: and a black made with ſilver and lead, which ſerves to fill up the cavities of engraved things.

Lamp-**BLACK** is the ſoot of oil collected as it is formed by burning. It is a browniſh black; but nevertheleſs, being of a good texture for mixing either with oil or water, and drying well with oil, it is the principal black at preſent uſed in all nicer kinds of painting: for notwithſtanding ivory-black far ſurpaſſes this in colour, the groſs and adulterate preparation of all that is to be now obtained has occaſioned it to be greatly rejected.

The lamp-black is made by burning oil in a number of large lamps in a confined place, from whence no part of the fumes can eſcape; and where the ſoot formed by theſe fumes, being collected againſt the top and ſides of the room, may be ſwept together and collected: and this, being put into ſmall barrels, is ſold for uſe without any other preparation.

The goodneſs of lamp-black lies in the fullneſs of the colour, and the being free from duſt or other impurities. The lightneſs of the ſubſtance furniſhes the means of diſcovering any adulteration if to a great degree; as the bodies with which lamp-black is ſubject to be ſophiſticated are all heavier in a conſiderable proportion.

Ivory-**BLACK** is the coal of ivory or bone, formed by giving them a great heat, all acceſs of air to them being excluded. It is, when pure and genuinely prepared from the ivory, a full clear black; and would be the moſt uſeful of any, in every kind of painting, but that it is apt to dry ſomewhat too ſlowly in oil. At preſent, nevertheleſs, being prepared only by thoſe who manufacture it from bones in very large quantities for coarſe uſes, and ſell it at an extreme low price, it is ſo groſly levigated, being ground only in hand or horſe-mills, and adulterated moreover copiouſly with charcoal duſt, which renders it of a blue caſt, that it is wholly exploded from all more delicate purpoſes, and lamp-black uſed in the place of it, though inferior, with regard to the purity and clearneſs of the black colour, to this when good. As the ivory-black, notwithſtanding, has its merit in moſt kinds of painting, when its preparation is properly managed, particularly in water and varniſh; thoſe who deſire to have it may prepare it themſelves in perfection by the following means.

Take plates, chips, or ſhavings of ivory, and ſoak them in hot linſeed oil; or if filings are to be more eaſily procured, they may be uſed moiſtened with the hot oil: put them into a veſſel which will bear the fire, covering them with a ſort of lid made of clay and ſand, which ſhould be dried, and the cracks repaired before the veſſel be put into the fire. Procure this veſſel to be placed in a tobacco-pipe maker's or potter's furnace, or any other ſuch fire; and let it remain there during one of their heats. When it ſhall be taken out, the ivory will be burnt properly; and muſt be afterwards thoroughly well levigated on the ſtone with water; or it ſhould, indeed, to have it perfectly good, be alſo waſhed over.

Thoſe who have a calcining furnace, may very commodiouſly burn the ivory in it; and the fire need not be continued longer than while the fumes, that ariſe from the veſſel containing the ivory, appear to flame. This operation may likewiſe be performed in a ſubliming furnace, by putting the ivory in a retort, coated with the fire-lute, and fixing the retort for the ſublimers; and a proper receiver being fitted to the receivers, the fumes will be detained in it, and the ſmell prevented from being in the leaſt troubleſome: the fire muſt in this caſe be continued while any groſs fumes come over.

The goodneſs of ivory-black may be perceived by its full black colour, not inclining too much to blue; and by its fineneſs as a powder.

Blue-**BLACK** is the coal of ſome kind of wood, or other vegetable matter, burnt in a cloſe heat where the air can have no acceſs. The beſt kind is ſaid to be made of vine ſtalks and tendrils: but there are doubtleſs many other kinds of vegetable ſubſtances from which it may be equally prepared. It is, when good, a fine bluiſh black colour, uſeful in moſt kinds of paintings for many purpoſes; but is rarely to be had at preſent well prepared; and, therefore, much neglected in moſt nicer caſes.

Thoſe who deſire to have blue black perfectly good, may prepare it in the manner above directed for the ivory-black, from the vine ſtalks or tendrils, or any other twigs of wood of an acid taſte and tough texture; but the ſoaking in oil, preſcribed for the ivory, muſt be here omitted.

The goodneſs of the blue-black conſiſts in the cleanneſs and blue caſt of its black colour; and the perfectneſs of its levigation, which ſhould be managed as directed for the ivory-black.

Currier's **BLACK** ſignifies a teint or dye laid on tanned leather; of which there are uſually two, the firſt made of galls, ſour ale, and old iron; the ſecond of galls, copperas, and gum-arabic.

BLACK-BIRD, *Merula*, in ornithology. See the article MERULA.

BLACK *Land*, in agriculture, a term by which the huſbandmen denote a particular ſort of clayey ſoil, which however they know more by its other properties than by its colour, which is rarely any thing like a true black, and often but a pale grey. This, however pale when dry, always blackens by means of rain; and when plowed up at thoſe ſeaſons, it ſticks to the plow-ſhares; and the more it is wrought, the muddier and duſkier-coloured it appears. This ſort of ſoil always contains a large quantity of ſand, and uſually a great number of ſmall white ſtones.

BLACK *Flux*, in minerology, a flux uſed in the aſſaying of ores, and is made as follows; — Take one part of nitre, and two parts of common tartar; reduce each to powder, mix them together, and deflagrate the whole in a crucible, by lighting the mixture at the top; which thus turns to a kind of alkaline coal, that is to be pulverized and kept in a cloſe glaſs, to prevent its diſſolving, as it would do in a moiſt air.

This flux is of general uſe; and to have it ready at hand, ſhortens the buſineſs of making aſſays in metallurgy, and renders the operation more exact than when crude tartar and nitre are employed; becauſe the deflagration might thus carry off ſome part of the ore, and defraud the account: for the ſame reaſon the mixture is here directed to be fired at top, otherwiſe a conſiderable part might be loſt in the deflagration, which would prove much more tumultuous and violent, if the matter was thrown into a red-hot crucible. *Shaw's Chem. Lectures.*

BLACK *Tin*, in minerology, a denomination given to the tin-ore when dreſſed, ſtamped, and waſhed ready for the melting-houſes, where it is refined into a pure metal.

It is prepared into this ſtate by means of beating and waſhing; and when it has paſſed through ſeveral baddles or waſhing-troughs, it is taken up in the form of a black powder like fine ſand, called black-tin.

BLACK, in heraldry, is called ſable. See the article SABLE.

BLACK, in horſemanſhip. Black horſes are very beautiful, eſpecially when they are of a jet ſhining black, and well marked, and have not too much white: for as a great deal of white, eſpecially when it ſpreads round their eyes, and a great way up their legs, adds nothing to their beauty, ſo neither does it add any thing to their goodneſs. The Engliſh black horſes have more white than the black horſes of any other country. I have known many fine Spaniſh horſes, ſome Arabs, and one Egyptian, the only one I ever ſaw of that country, all without any white; and the Dutch and Daniſh horſes ſeldom have much; though a ſtar or blaze, and ſometimes a white muzle, and one or more of the feet tipped with white, always looks beautiful and lively, and is no diminution to the goodneſs of a horſe, but moſt think an addition, from an opinion that horſes without any mark are generally ſtubborn and ill-conditioned. Some black horſes have brown muzles, are browniſh on their flanks and between their hips: theſe are often called black browns, as they are not a perfect black, but approach near to the colour of a tawny black hound: ſome are of a lighter colour about their muzles, and are called mealy-mouthed horſes; and of this ſort are the pigeon-eyed horſes, which have a white circle round their eye-lids, and their fundaments often white. But after all, I have found many of the Engliſh black horſes, eſpecially of the largeſt breed, not ſo hardy as the bays and cheſnuts, &c. Thoſe that partake moſt of the brown, are generally the ſtrongeſt in conſtitution. *Gibſon on Horſes.*

BLACK-BOOK *of the Exchequer.* See the article EXCHEQUER.

BLACK-STRAKES *of a Ship*, the planks immediately below the bends, which are always covered with tar, mixed with a black powder, and form an agreeable contraſt to the white bottom below, and the ſcraped planks covered with turpentine above.

BLADDER, *veſica urinaria*, in anatomy, a kind of membraneous and fleſhy pouch or bottle, capable of dilatation and contraction, ſituated in the lower part of the abdomen, immediately behind the ſymphyſis of the oſſa pubis, and oppoſite to the beginning of the inteſtinum rectum. The figure of it is nearly that of a ſhort oval. It is broader on the fore and back ſides than on the lateral parts; rounder above than below, when empty; and broader below than above, when full.

It is divided into the body, neck, and bottom; into an interior, poſterior, and two lateral parts. The upper part is termed the fundus or bottom, and the neck is a portion of the lower part, which is contracted like the gullet of ſome veſſels.

The bladder is made up of ſeveral coats, almoſt like the ſtomach. That part of the external coat which covers the upper, poſterior, and lateral ſides of the bladder, is the true lamina or membrane of the peritonæum; and the reſt of it is ſurrounded by a cellular ſubſtance, by the intervention of which the peritonæum is connected to the muſcular coat.

The proper coats are three in number, one muſcular, one nervous, and one villous, which is the innermoſt. The muſcular coat is compoſed of ſeveral ſtrata of fleſhy fibres, the outermoſt of which are moſtly longitudinal; the next to theſe are more inclined toward each hand, and the innermoſt more and more oblique, and they become at length almoſt tranſverſe. All theſe fibres interſect each other in various manners, and they are connected together by a fine cellular ſubſtance, and may be ſeparated by inflating that ſubſtance.

The nervous coat is nearly of the ſame ſtructure with the tunica nervoſa of the ſtomach.

The internal coat is ſomething granulated and glandular, and a mucilaginous ſerum is continually diſcharged through it, which moiſtens the inner ſurface of the bladder, and defends it againſt the acrimony of the urine. It appears ſometimes altogether uneven on the inner ſide, being full of eminences and irregular rugæ when empty, and in its natural ſtate of contraction. Theſe inequalities diſappear when the bladder is full, or when it is artificially diſtended by air, or by injecting any liquid.

The external fibres of the muſcular coat are more numerous than the internal; and the moſt longitudinal anterior fibres form a kind of incurvation round the urachus at the top of the bladder, much like that of one of the fleſhy portions which ſurround the ſuperior orifice of the ſtomach, and lower extremity of the œſophagus. This incurvation paſſes behind the urachus.

The portion of the peritonæum which covers the poſterior convex ſide of the bladder, forms a very prominent tranſverſe fold, when the bladder is contracted, which diſappears when the bladder is extended. This fold ſurrounds the poſterior half of the bladder, and its two extremities are elongated toward each ſide, by which elongations a kind of lateral ligaments of the body of the bladder is formed, which are more conſiderable in children than in adults.

The lower part of the bladder, which deſerves the name of fundus much better than the upper part, is perforated by three openings, one anterior and two poſterior. The anterior opening is formed by an elongation of all the proper coats, in form of a gullet, turned much in the ſame manner with the inner orifice of the roſtrum of the head of an alembic. This elongation is called the neck of the bladder.

The other two openings in the true fundus of the bladder are formed by the ureters, which, in their courſe downward, run behind the ſpermatic veſſels, and then behind the lower part of the bladder, approaching near each other. See URETERS.

Each ureter lies between the umbilical artery and vas deferens of the ſame ſide; the artery lying on the outſide of the ureter, and the vas deferens on the inſide.

Afterwards they get between the vaſa deferentia and the bladder, croſſing theſe canals; and then, at about a finger's breadth from each other, they begin to pierce the coats of the bladder. They run a little way between the muſcular and nervous coats, and open into the bladder obliquely, ſomething nearer each other than when they firſt entered its coats.

The orifices of the ureters in the bladder are ſomething oval and narrower than the cavity of the ureters immediately above them. The edge of theſe orifices is very thin, and ſeems to be formed merely by the union of the internal coat of the bladder with that of the ureters.

The arteries of the bladder are furniſhed by the hypogaſtricæ or iliacæ internæ; being rami of the arteria ſciatica, epigaſtrica, and umbilicalis, on each ſide. The veins come from thoſe of the ſame names with the arteries.

The nerves of the bladder come from the crurales, and alſo from the ſympathetici maximi, by means of their communication with the crurales. It has likewiſe ſome nerves from the plexus meſentericus inferior. *Winſlow's Anatomy.*

The diſeaſes of the bladder are the ſtone, inflammations, ulcers, &c. See the article STONE, &c.

For the other bladders of the body, ſee the article VESICULA.

Air-BLADDER, in phyſiology. See the article AIR-BLADDER.

BLADE, in botany, that part of the flower, or florid attire of a plant, which ariſes out of the concave of the ſheath, and, at the top, uſually divides into two parts, which are covered with globules of the ſame nature as thoſe of the apices, but not ſo copious.

The blade runs through the hollow of the ſheath and baſe, and is faſtened to the convex of the ſeed-caſe, having its head and ſides beſet with globules, which thro' a glaſs appear like turnip-ſeeds, and which, in ſome plants, grow cloſe to foot-ſtalks. Theſe globules, as the blade ſprings up from within the ſheath, are ſtill rubbed off, and ſo ſtand like a powder on both. In ſome plants, as knap-weed, they ſeem alſo to grow on the inſide of the ſheath, as appears on ſplitting it with a pin. The head of a blade is divided uſually into two; but ſometimes, as in cichory, into three parts, which, by degrees, curl outward, like ſcorpion-graſs.

Blade, in commerce, a thin ſlender piece of metal, either forged by the hammer, or run and caſt in moulds, to be afterwards ſharpened to a point, edge, or the like.

BLAFART, in commerce, a ſmall coin, current at Cologn, worth ſomething more than a farthing of our money.

BLAIN, among farriers, a diſtemper incident to beaſts, being a certain bladder growing on the root of the tongue, againſt the wind-pipe, which ſwells to ſuch a degree, as to ſtop the breath. It comes by great chafing and heating of the ſtomach, and is perceived by the beaſt's gaping and holding out his tongue, and foaming at the mouth: to cure it, caſt the beaſt, take forth his tongue, and then ſlitting the bladder, waſh it gently with vinegar and a little ſalt.

BLANCHING, in general, implies the art of bleaching or whitening. See Bleaching.

Blanching of copper is done various ways, ſo as to make it reſemble ſilver. If it be done for ſale, it is felony, by 8 and 9 William III. ch. xxvi.

Blanching, in coinage, the operation performed on the planchets or pieces of ſilver, to give them the requiſite luſtre and brightneſs. They alſo blanch pieces of plate, when they would have them continue white, or have only ſome parts of them burniſhed.

Blanching, as it is now practiſed, is performed by heating the pieces on a kind of peel with a wood-fire, in the manner of a reverberatory; ſo that the flame paſſes over the peel. The pieces being ſufficiently heated, and cooled again, are put ſucceſſively to boil in two pans, which are of copper: in theſe they put water, common ſalt, and tartar of Montpelier. When they have been well drained of this water in a copper ſieve, they throw ſand and freſh water over them; and when dry, they are well rubbed with towels.

Blanching, among gardeners, an operation whereby certain ſallads, roots, &c. are rendered whiter than they would otherwiſe be.

It is this: after pruning off the tops and the roots of the plants to be blanched, they plant them in trenches about ten inches wide, and as many deep, more or leſs as is judged neceſſary; as they grow up, care is taken to cover them with earth, within four or five inches of their tops: this is repeated, from time to time, for five or ſix weeks, in which time they will be fit for uſe, and of a whitiſh colour where covered by the earth.

Blanching alſo denotes the operation of covering iron plates with a thin coat or cruſt of tin.

BLANK, or Blanc, properly ſignifies white. See White.

Blank, in commerce, a void or unwritten place which merchants ſometimes leave in their day-books or journals. It is alſo a piece of paper, at the bottom of which a perſon has ſigned his name, the reſt being void. Theſe are commonly intruſted into the hands of arbiters, to be fitted up as they ſhall think proper, to terminate any diſpute or law-ſuit.

Blank-Bar, in law, the ſame with common bar. See the article Bar.

Blank-Tickets, in lotteries, thoſe drawn without any prize.

Blank-Verse, in the modern poetry, that compoſed of a certain number of ſyllables, without the aſſiſtance of rhyme. See the articles Verse and Rhyme.

***Point*-Blank**. See Point-Blank.

BLANKET, a coverlet for a bed: a ſtuff commonly made of white wool, and wrought in a loom like cloth; with this difference, that they are croſſed like ſerges.

When they come from the loom, they are ſent to the fuller; and after they have been fulled and well cleaned, they are napped with a fuller's thiſtle.

There are alſo blankets made with the hair of ſeveral animals, as that of goats, dogs, and others.

The manufacture of blankets is chiefly confined to Witney in Oxfordſhire, where it is advanced to that height, that no other place comes near it. Some attribute a great part of the excellency of the Witney blankets to the abſterſive, nitrous water of the river Windruſh, wherewith they are ſcoured; others rather think they owe it to a peculiar way of looſe ſpinning, which the people have thereabouts. Be this as it will, the place has engroſſed almoſt the whole trade of the nation for this commodity; inſomuch that the wool fit for it centers here from the furthermoſt parts of the kingdom. There are ſaid to be at leaſt ſixty blanketers in that town, who, amongſt them, have at leaſt one hundred and fifty looms, and employ three thouſand perſons, from children of eight years old, who work out about a hundred packs of wool per week.

BLANQUILLE, in commerce, a ſmall ſilver coin, current in the kingdom of Morocco, and all that part of the coaſt of Barbary. It is worth about three halfpence of our money.

BLASPHEMY, an indignity or injury offered to the Almighty, by denying what is his due, and of right belonging to him; or by attributing to the creature that which is due only to the Creator.

The primitive church diſtinguiſhed blaſphemy into three ſorts. 1. The blaſpheming of apoſtates, whom the heathen perſecutors obliged not only to deny, but to curſe Chriſt. Theſe blaſphemers were puniſhed with the higheſt degree of eccleſiaſtical cenſure. 2. The blaſphemy of heretics, and other profane Chriſtians. In this ſenſe, they included not only thoſe who maintained impious doctrines, but thoſe who uttered profane and blaſphemous words, derogatory to the majeſty and honour of God. The ſame puniſhment that was inflicted upon heretics and ſacrilegious perſons, was conſequently the fate of this ſort of blaſphemers. 3. The blaſphemy againſt the Holy Ghoſt, concerning which the opinions of the ancients varied. Some apply it to the ſin of lapſing into idolatry and apoſtacy, and denying Chriſt in time of perſecution. Others made it conſiſt in denying Chriſt to God: others, in denying the divinity of the Holy Ghoſt: and others place it in a perverſe and malicious aſcribing the operations of the Holy Spirit to the power of the devil; and that againſt expreſs knowledge and conviction of conſcience.

Blaſphemy, among the Jews, was puniſhed by ſtoning the offender to death. With us it is puniſhable at common law, by fine and pillory. And by a ſtatute of William III. if any perſon ſhall, by writing or ſpeaking, deny any of the perſons in the Trinity, he ſhall be incapable of any office; and for the ſecond offence, be diſabled to ſue in any actions, to be an executor, &c.

BLAST, in a general ſenſe, denotes any violent exploſion of air, whether occaſioned by gun-powder, or by the action of a pair of bellows.

Blasts, among miners, the ſame with damps. See the article Damp.

Blast, or Blight, in huſbandry. See Blight.

BLASTING, a term uſed by miners for the tearing up rocks, which lie in their way, by the force of gunpowder.

In order to do this, a deep hole is made in the rock, which being charged with gunpowder, they fill it up; leaving only a touch-hole, with a match to fire the charge.

BLAZE, a white ſpot in a horſe's face.

BLAZING-STAR, the ſame with comet. See the article Comet.

BLAZONING, or Blazonry, in heraldry, the art of decyphering the arms of noble families.

The word originally ſignifies the blowing or winding of a horn, and was introduced into heraldry as a term denoting the deſcription of things borne in arms, with their proper ſignifications and intendments, from an ancient cuſtom the heralds, who were judges, had of winding an horn at juſts and tournaments, when they explained and recorded the atchievements of knights.

In blazoning a coat of arms, you muſt always begin with the field, and next proceed to the charge; and if there be many things borne in the field, you muſt firſt name that which is immediately lying upon the field. Your expreſſions muſt be very ſhort and expreſſive, without any expletives, needleſs repetitions, or particles. Such terms for the colours muſt be uſed, as are agreeable to the ſtation and quality of the bearer. All perſons beneath the degree of a noble, muſt have their coats blazoned by colours and metals; noblemen by precious ſtones, and kings and princes by planets.

BLEA, in the anatomy of plants, the inner rind or bark. It may be conſidered as an aſſemblage of ſtraight fibres ranged vertically and parallel to one another.

While the blea remains any thing ſoft, and retains ſomewhat of the nature of bark, it may maintain a feeble vegetation; but when it is grown abſolutely hard and woody, it can no longer contribute thereto.

BLEACHING, the art or method of whitening linens, ſtuffs, ſilks, hair, wax, &c.

This art, or rather the different proceſſes in which it conſiſts, being of the utmoſt importance to ſeveral manufactures, the reader will not, we preſume, be diſpleaſed to find it explained in a particular and intelligent manner.

The proper materials for bleaching either linen yarn, or cloth, are wood-aſhes brought from Muſcovy and Germany, and Caſſoup, alſo a ſort of aſhes imported from Dantzick. But the common wood-aſhes and weed-aſhes made in this kingdom, are as good as the beſt, unleſs it be for bleaching cloth of a very high price. He that would bleach well, muſt be provided with a convenient bleaching yard, bleaching-houſe, and all things ſuitable; for ſhifts in trade fail in the event. He ought to have his bleaching-yard well watered. The nature of the water ought to be ſoft, ſuch as will break ſope. The yard ought to be ſo ſituated, as that in the drought of ſummer the trenches and pipes may be conſtantly ſupplied. As for the bleaching-houſe, it ought to be furniſhed with good coppers and boilers, good tubs for bucking, and alſo ſtands and vats for keeping the ſeveral ſorts and degrees of lyes, and other great ſtands and vats for keeping the milk, or acidulated liquor.

In the bleaching of your yarn, you muſt firſt open each hank, and lay it in your bucking tub; then cover your yarn with cold water, and let it ſteep for about nine hours: therefore let go that water by means of a cock, which ought to be fixed near the bottom of your tub; and then fill it again with water. Continue thus to ſteep and cleanſe your yarn from its filth, till ſuch time as you perceive that the water is no way foul that comes from it: then withdraw your yarn out of your tub, and rinſe it well in clean water. After rinſing it, you muſt wring out all the water, by wringing three or four hanks at a time: then lay it out to dry in your bleaching-yard; but be ſure never to beat or beetle it By the time your yarn is perfectly dry, you are to be provided with lye proper for bucking. The firſt bucking you give your yarn, ought to be with your ſtrongeſt lye. Your yarn being quite dry, you muſt dip three or four hanks at a time, and lay them in your bucking tub, in the moſt equal and even manner that poſſibly you can; never preſſing them too much, to the end the lye may the better pierce and penetrate them. All your yarn being thus laid in your tub, put the remainder of your lye, in which you dip your yarn, into a pot or pan, and make a ſlow fire under it, taking care not to heat your lye ſo for the firſt five hours, whilſt you are thus bucking, but that you may be able to endure your hand in it. Your fire made, you muſt very often take out ſome of your lye, and pour it upon your yarn in your tub; then you muſt increaſe your fire gradually and ſlowly, ſo as in four hours time more to bring your lye to boil: during all which time, you muſt continue to take your lye out of your copper, and put it into your tub by ſmall quantities at a time. When your lye begins to boil, you muſt let it boil on for three hours, during the whole time lading or pouring your lye out of your copper into your tub; ſo that you will be twelve hours bucking your yarn. If your lye was ſtrong and good, your yarn will be brought to a yellow colour, if the improper preparing of ſome flax does not hinder it: but where you find your yarn, or part of it, does not attain to this yellow colour, you muſt repeat bucking until it anſwers your ends. When your yarn is ſufficiently bucked for your purpoſe, you muſt take it out, rinſe it in cold water, and wring it well; taking care to wring but three or four hanks at a time, that it may the better endure the labour. Be ſure never to beat or beetle it, as hath been already obſerved. Then ſpread it out in your bleaching-yard; where it muſt lie expoſed to the weather for three or four days before you turn it. When that time is over, turn it, and let it lie there till the ſide that is undermoſt be as good a colour as the other. You muſt water yarn on the bleaching-yard as you do cloth, that it may whiten the ſooner, and lie the ſhorter time upon the green. This bleaching which was juſt now preſcribed to be given to your yarn, is not intended to make it very white, but chiefly to cleanſe it from the filth that is incident to it, that your cloth may be the thicker and ſtronger, and with more eaſe brought to a colour when it comes to be bleached. Wherefore bleach your yarn for all kinds of cloth, except cambricks and lawns, the yarn whereof ſhould not be bleached before it be woven.

BLEACHING *of Linen Cloth.* In order to perform this operation, you muſt begin with it as you did with your yarn, by ſteeping it in cold water in your tub for nine hours; then change the water on it, till ſuch time as you can perceive that the water is no longer diſcoloured; rinſe, wring, and lay it out to bleach, obſerving conſtantly to water it ſo as never to ſuffer it to be too dry. When it hath lain three or four days thus on the graſs, and is dry, you muſt take hold of each piece, one after another, by the ſelvedge, and draw the cloth to you, ſtill holding it in the moſt even manner that you can, until you come to the farther end, with the corners of which you tie your cloth very looſely in the middle of the folds, and ſo lay it in your bucking-tub, with the two ſelvedges upwards. This you muſt do until you have placed as much cloth in your tub as will cover the bottom of it, taking care not to pack the cloth ſo cloſe but that your lye may penetrate to all parts equally; and at the ſame time you muſt obſerve, never, if poſſible, to buck your cloth but when it is very dry. When you have laid the firſt range of cloth in your tub, you muſt pour as much milk-warm lye on it as will ſufficiently ſoak through all parts of your cloth. Then you muſt lay another range in the ſame manner as you did the firſt; pour on more lye until that be ſoaked as the other was; and continue to do ſo till your tub be full. That done, you muſt begin to buck, for twelve hours together, obſerving the directions, in relation to the fire, given for the former article. Your two firſt buckings ought to be of very ſtrong lye; but afterwards you ſhould abate of that ſtrength in proportion as your cloth grows nearer to its perfection of whiteneſs, leſt you make it rotten and unſerviceable by over-ſtrong lye. After each bucking you muſt carry it ſtraight to the bleaching-yard, where it ought to lie forty-eight hours. This you muſt perform ſucceſſively as many times as you ſee occaſion, according to the nature of the cloth, from the buck to the bleaching-yard, and from the bleaching-yard to the buck, before you begin to uſe it with milk; ſtill giving it weaker lye after the two firſt buckings, and conſtantly obſerving to water your cloth on the graſs, ſo as never to ſuffer it to be dry during theſe bleachings. It is impoſſible to preſcribe a certain rule, or to direct the preciſe number of buckings that ought to be given to cloth, becauſe that depends on the ſorts or kinds you are to bleach; and therefore the experience and judgment of the bleacher muſt guide him therein. Your thin fine cloths will bleach much ſooner than your coarſe or ſtiff ſtubborn cloths will do: but both ſorts muſt be dry when you put them into the milk;

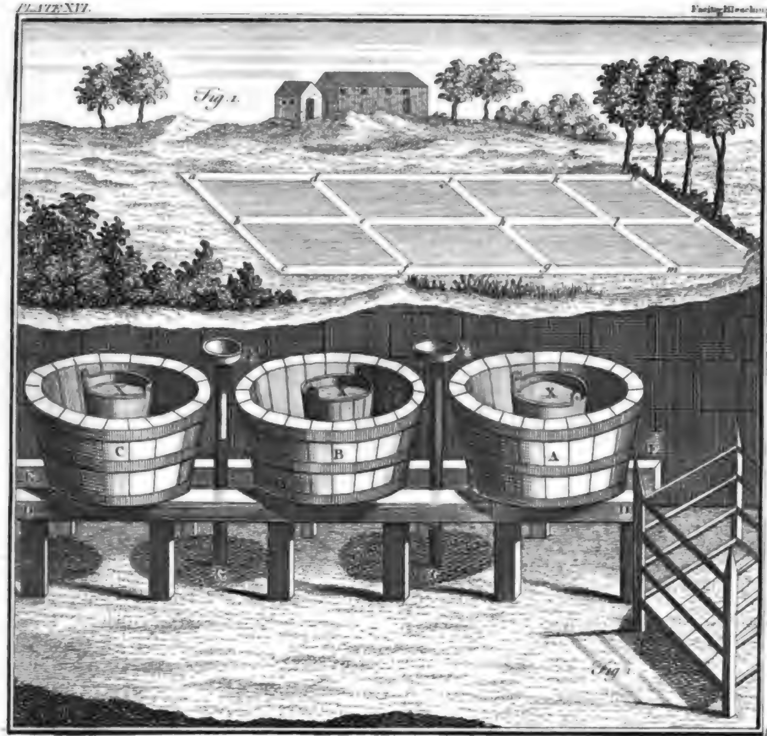


Fig. 1.
a
d
e
k
b
h
l
o
c
g
m
X
X
X
C
B
A
F
E
D
G
G
Fig. 2.

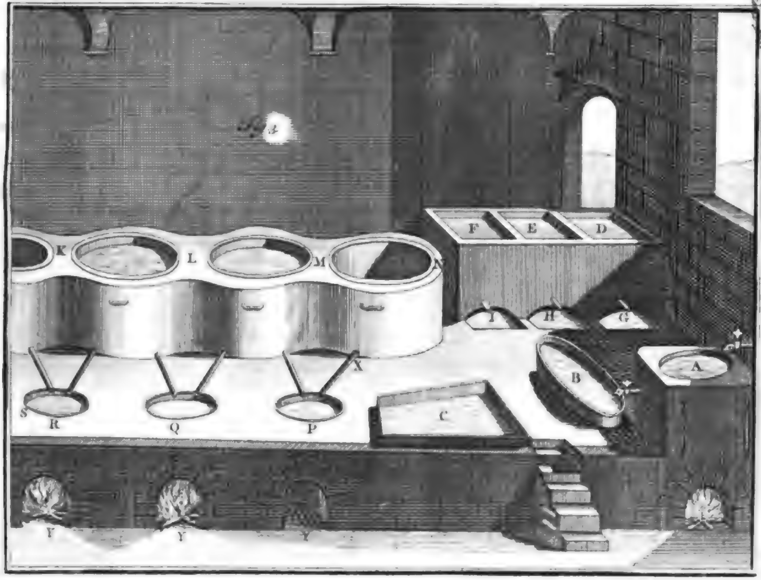


Fig. 3.
K
L
M
N
F
E
D
I
H
G
A
B
C
X
S
R
Q
P
Y
Y
Y

or which will anſwer the ſame purpoſe, a quantity of water rendered acid by oil of vitriol, in the proportion of half an ounce of the latter to a gallon of the former.

The milking of cloth or laying it in an acidulated liquor, was not uſed till of late; but it is found by experience to contribute greatly to bring cloth to a good colour. It has been already obſerved, that you muſt have large tubs or vats for the keeping of your milk. Theſe vats, which ſhould hold a ton or two a-piece, you ought to keep full of butter-milk, or ſour milk, as it is commonly called, ſkimmed milk, whey, and the like, mixed together; there to ſtand and ſour until you have occaſion to uſe them. It is very rare that your milk proves too ſour; but if at any time it ſhould, abate its ſourneſs by adding cold water. When your cloth is dry, and ready to be milked, have a great tub with milk ſet half-way in the ground. Your cloth being well ſoaked therein, you muſt preſs it down with heavy planks or weights, ſo as it may not be raiſed by the fermentation that will be in your milk or acid liquor. When the cloth has lain a-while, take care that theſe weights be ſufficient; and that your planks be neither of new oak or alder, for thoſe woods ſpoil and ſtain cloth very much, as will alſo ſeveral ſorts of ſtones, if laid upon cloth either in the tubs or in the field. Thus your cloth muſt ſteep for at leaſt forty-eight hours; or, if you pleaſe, for three days and three nights; for it will be ſo much the better for the cloth: then ſpread it on the green, and water it well, to prevent its drying with the milk or acid in it: when this is ſufficiently done by watering, you muſt rinſe the cloth, and waſh it well with a lather of ſope. Your next buſineſs is to buck the cloth again juſt as it comes from the ſope-ſuds; and when bucked, you muſt, without further rinſing, ſpread it on the graſs in your bleaching-yard: there it muſt remain expoſed to the air for two days and two nights, and be conſtantly watered in the day-time, when you lay it out to bleach. This operation muſt be repeated ſix, ſeven, or eight times ſucceſſively, until you perceive your cloth is come to the colour you deſire to give it; that is, you muſt milk, then bleach, then waſh, then ſope, and buck by turns, until you attain your end; for it is impoſſible to propoſe a certain rule, becauſe of the great variety of cloth: only this muſt be obſerved, that each time you buck, you muſt ſpend twelve hours, during all which time you ought to be conſtantly lading or pouring the lye into your tub, according to the former directions; for otherwiſe you may chance to burn your cloth, eſpecially when the lye grows hot. This rule is alſo conſtantly to be obſerved, that your cloth be very dry when you lay it in the milk or acid liquor. This laſt time you milk your cloths, you ought, inſtead of the uſual waſhing or rinſing, to lay them in an open ciſtern; where people with clean feet ſhould tread them very well for half an hour at leaſt. That done, waſh them with clean water, until you perceive the fluid to be no way diſcoloured: then having made your bucking-tub very clean, lay your cloths in it juſt as you did at firſt, and ſteep them in warm water for an hour: then let go that water, and ſteep them a ſecond time in water ſomewhat warmer, for an hour longer: let that water go likewiſe, and ſteep your cloths a third time in water yet warmer than the former; but not ſo hot as to boil. This laſt ſteeping need not be near ſo long as the preceding; half an hour is ſufficient. Then take out your cloth, rinſe and wring it well, that it may be cleanſed from the lye, milk, or acid liquor, and ſope, and made more ſuſceptible of receiving the ſtarch and blue; which is the next operation.

It is impoſſible to preſcribe a certain rule for preparing of ſtarch to dreſs your cloth, becauſe of the great variety of cloths which muſt be made: fine thin cloths require a thicker and more ſubſtantial ſtarch than coarſer cloths do; therefore it is requiſite that bleachers ſhould have ſome experience and knowledge therein. Every laundreſs knows how to make ſtarch, and prepare it for the beautifying of her linen: but the ſtarch made uſe of in this trade is much thinner than theirs. The way to make it is this: Fill the boiler or pan, wherein you deſign to make your ſtarch, about three quarters full of water; when the water boils, pour into it as much ſtarch diſſolved in water, as will compleatly fill your boiler; keep it ſtirring perpetually, leſt it burn, and let it boil for half an hour, or thereabouts; then take it off the fire, ſtrain it into another veſſel with warm water, in proportion to the cloth you deſign to dreſs, taking great care to keep it ſtirring, breaking and diſſolving the clods of ſtarch, that the whole may be of an equal thickneſs or conſiſtency. When this part of the operation is finiſhed, mix powder blue in water, in ſuch proportion as you would give your cloth a higher or a lower colour, and add it to your ſtarch prepared as above. By this means you may make your ſtarch thicker or thinner, as you think will be beſt adapted to your cloth. Take great care never to uſe indigo, or ſtone-blue; becauſe it gives a dull dark colour.

When you have thus prepared your water for ſtarching and bluing, put your cloth into it; and when it is well ſoaked, take it out, wring it very hard, and ſpread it on the graſs in your bleaching-yard to dry. You will generally find that the blue will ſettle in ſome parts of your cloth more than in others: in which caſe you muſt, with a clean cloth wet in water, rub ſuch parts till you bring them down to the colour they ought to have. Your cloths being now well ſtarched and blued, according to the circumſtances or nature thereof, and being very dry, either fold them up yourſelf, or ſend them to a lapper.

It is neceſſary to add a word or two in reference to the preparing of lye for bucking your cloth. It has been already mentioned, that the beſt aſhes yet known in the world, are wood-aſhes and caſſoup. But it is impoſſible to preſcribe ſuch a rule as would render a perſon entirely ignorant of the bleaching trade perfect; for it is in this, as in every other mechanical trade, requiſite, that the perſon employed ſhould have experience and judgment enough to know the goodneſs or imperfection of the materials to be employed: but thoſe who have occaſion to make uſe of wood-aſhes, and caſſoup, will find that the following directions will be of great ſervice. Caſſoup and wood-aſhes are very hard; therefore you muſt reduce them ſeverally into powder; then to each hogſhead of boiling water, put 50 or 60 pound-weight of caſſoup, if you deſign to make a caſſoup-lye; or the like weight of wood-aſhes, if you intend to make your lye of that material: and ſo in proportion as to the quantity you would make. Having boiled your aſhes in the water about half an hour, take the fire from under the copper, that the lye may ſettle; which it will not do whilſt there is any heat under it. The liquor being clear, lade it gently from off the aſhes, and put it into a vat; where you muſt keep it apart from the reſt, till you have occaſion to uſe it: then put the ſame quantity of water into your copper as at firſt; and when it is ſettled, lade it off as before into another large vat, which ought to be twice or thrice bigger than your former, becauſe you muſt mix the ſecond and third lyes together. The third is made in the ſame manner as the two former. The two latter lyes are ſtrengthened, by adding as much of the firſt as you judge neceſſary: but be ſure to obſerve this rule; let your lye be rather ſomewhat too weak than too ſtrong, becauſe the former may be ſupplied by re-bucking your cloth, but if the latter ſhould happen, it will burn and deſtroy the whole. You will not extract the whole ſtrength of your aſhes by theſe lyes, and therefore muſt afterwards take them out of your boiler, and lay them into a kind of maſh tub, with the bottom fenced with ſtraw in order to prevent the aſhes clodding about the hole: then pour either hot or cold water upon them, and let the whole be well mixed or maſhed together; and after twenty-four hours ſoaking, draw it off as you do wort. This you ſhould repeat as long as you find any ſtrength in the aſhes, and keep theſe ſeveral lyes together, wherewith you may abate the force of your ſtrongeſt lyes, in proportion as you find your cloth to grow nearer the colour deſired. You will find theſe wood-aſhes and caſſoups, after you have extracted all the lye you can, very uſeful for manuring cold grounds.

There is a great difference between caſſoup and wood-aſhes. The firſt, being of a hard, harſh quality, is more proper for your firſt buckings, before you put your cloth to the milk or acidulated water: it ſearches and pierces the cloth with more force than the other: but after milking, the wood-aſhes are moſt proper; for by their ſoft oily quality, they nouriſh the cloth, and at the ſame time cleanſe it from its filth. The caſſoup, if uſed after the milking or acidulating of your cloth, may make it too thin; each therefore ſhould be uſed in their proper ſeaſons; for nothing will ſo effectually bring goods into reputation, and advance trade, as an honeſt conſcientious diſcharge of duty in a dealer.

In caſe caſſoup cannot be had, you may make uſe of wood-aſhes or pot-aſhes inſtead of it. The aſhes of any wood or plant, particularly ferns and whins, or furze, are good for bleaching cloth.

Explanation of Plate XVI.

Fig. 1. is the bleaching-yard, or green-meadow, where *a, b, c, d, e, f, g, h, i, k, l, m, n, o, p,* repreſent the pieces of linen ſpread on the graſs. The ſpaces between the ſeveral pieces are ſmall canals of water, which is frequently thrown with ſcoops upon the linen.

A, B, C, *Fig.* 2. are tubs in which the pieces of linen are ſoaped.

D, D, E, E, the ſtand or frame on which they are ſupported. X, X, X, wooden pails. E, E, diſhes for holding the ſoap. G, G, upright pieces on which the diſhes are placed.

Fig. 3. D, E, F, ſquare backs for holding the firſt or ſtrongeſt lye. G, H, I, other backs for receiving the lye when it has acquired a ſufficient degree of ſtrength, in the backs D, E, F. B, another back, into which the aſhes are thrown out of the backs D, E, F.

A, a furnace in which the lyes are boiled. B, a large tub for receiving the ſecond and third lies, and from which there is a paſſage into the back C, where it is ſuffered to ſettle.

P, Q, S, other furnaces for heating the lye. Y, Y, Y, the fire places of the furnaces P, Q, R, S.

K, L, M, N, large tubs for bucking the cloth or yarn, placed oppoſite to the furnaces P, Q, R, S; during which operation the lye returns into the furnaces by means of the pipes X.

Bleaching *of Hair* is done by ſpreading the hair to be bleached upon the graſs, in the ſame manner as linen, after it has been firſt waſhed out in a lixivious water.

This lye, with the force of the ſun and air, brings the hair to ſo perfect a whiteneſs, that the moſt experienced perſon may be deceived therein; there being ſcarce any way of detecting the artifice, but by boiling and drying it; which leaves the hair of the colour of a dead walnut-tree leaf.

Bleaching *of Silk.* The ſilk, being yet raw, is put into a linen bag, and thrown into a veſſel of boiling river water, in which ſope has been diſſolved, and thus boiled for two or three hours; the bag being turned ſeveral times, taken out and beaten, then waſhed out in cold water, and wrung out ſlightly, and thrown into a veſſel of cold water, mixed with ſope and a little indigo.

The indigo gives it the bluiſh caſt that is obſervable in white ſilks.

When it has been taken out of the ſecond veſſel, it is wrung out, and all the water and ſope ſqueezed out, ſhook out to untwiſt, and ſeparate the threads, and hung up in the air in a kind of ſtove, made on purpoſe, in which ſulphur is burnt, the vapour of which gives the laſt degree of whiteneſs to the ſilk.

Bleaching *of Woollen Stuff.* There are three methods of whitening woollen-ſtuffs; the firſt is with water and ſope, the ſecond is with vapour of ſulphur, the third with chalk, indigo, and vapour of ſulphur.

For the firſt, when the ſtuffs are come from the fulling-mill, they are to be put into ſoped water pretty hot, and worked afreſh by force of arms over a bench, which finiſhes the whitening which the fulling-mill had begun; in the laſt place they are to be waſhed out in fair water and dried; this is called the natural way of bleaching.

The ſecond method is what is commonly called bleaching by the flower; the ſtuff is firſt waſhed in river water, and then put to dry on poles, and when it is half dry, ſpread out in a kind of ſtove, wherein ſulphur is burnt, the vapour of which diffuſing itſelf, ſticks by little and little over all the ſtuffs, and gives it a fine whitening.

The third method is thus; after the ſtuffs have been waſhed, they are to be thrown into cold water, impregnated with chalk and indigo, in which they are well agitated: they are waſhed afreſh in elder water, then half dried on poles, and then ſpread in a ſtove to receive the vapour of the ſulphur, which finiſhes the bleaching.

This is to be remembered, that when a ſtuff has once received the ſteam of ſulphur, it will ſcarce receive any beautiful dye, except black and blue.

Bleaching *of Wax*, the operation of changing the colour of the yellow into a beautiful white: it is done in the following manner.

The common yellow wax is firſt reduced into ſmall grains, by melting it, and throwing it while hot into cold water, or ſpreading it into very thin cakes. The wax thus granulated or flatted, is placed in the open air on linen cloths, where it remains night and day, it being neceſſary that it be expoſed both to the rays of the ſun, and the influence of the dew. After thus lying a conſiderable time, it is again melted and granulated, or flattened into cakes, and once more expoſed to the action of the ſun and dew. Theſe operations are alternately performed till the wax has acquired the requiſite degree of whiteneſs.

When the ſun and dew have perfectly bleached the wax, it is melted for the laſt time, taken out of the copper with a ladle, and poured, by means of a double funnel, into ſhallow moulds or round cavities formed in a board, the moulds being previouſly wetted with cold water, that the wax may not ſtick to them; and in this manner the cakes of white wax we ſee in the ſhops are made. Theſe cakes are then taken out of the moulds, and again expoſed to the action of the air, dew, and ſun, for two days and two nights, in order to dry them thoroughly, and render them more tranſparent.

Explanation of Plate XVII.

The upper compartment of the plate repreſents a bleaching-yard for wax, filled with three ſtages, on which the wax, after being melted and granulated, or rather laminated, in the melting-houſe, is expoſed to the action of the ſun, air, and dew.

Fig. 3. is a ſtage of wood, conſiſting of fourteen ſquare compartments, and ſupported at each angle by perpendicular pieces of wood. In the frame or external part of the ſtage a number of holes are bored at equal diſtances from one another, in which pins and ſticks are placed.

Fig. 2. repreſents another ſtage, with the pins and ſticks placed in the holes.

Fig. 1. is another ſtage, covered with linen cloths, and on thoſe cloths a quantity of wax, after being melted and laminated, is placed, in order to receive the influence of the ſun, air, and dew. The ſides of the cloths are faſtened to the ſticks thruſt into the holes, by means of crotchets or braces ſewed to the ſelvedges.

The lower compartment of the plate is a plan of the melting houſe; a perſpective view of the internal part of which is given in the upper compartment of plate XVIII.

A, A, A, are furnaces or coppers for melting the wax. They are made of copper, and well tinned on the inſide.

B, C, are large tubs into which the wax runs in a melted ſtate from the coppers, by means of proper cocks, as may be ſeen in the perſpective view on plate XVIII, and there ſuffered to ſettle.

B B, C C, are tubs of the ſame kind, and ſupply the places of the former.

D, E, are large veſſels in the form of bathing tubs, containing a proper quantity of cold water.

F, F, are cocks for letting the water out of the bathing-tubs.

H, H, are cylinders.

I, I, ſtools for the perſons to ſit on, when they turn the cylinders.

G, the mouth of the ſink or drain.

K, L, a wooden ſtand for ſupporting the boards in which the moulds for caſting the wax into cakes, are formed.

R, S, another ſtand of the ſame kind, covered with the boards, filled with moulds.

Explanation of Plate XVIII.

The upper compartment of this plate is a perſpective view of the interior part of the above melting-houſe.

PLATE XIII

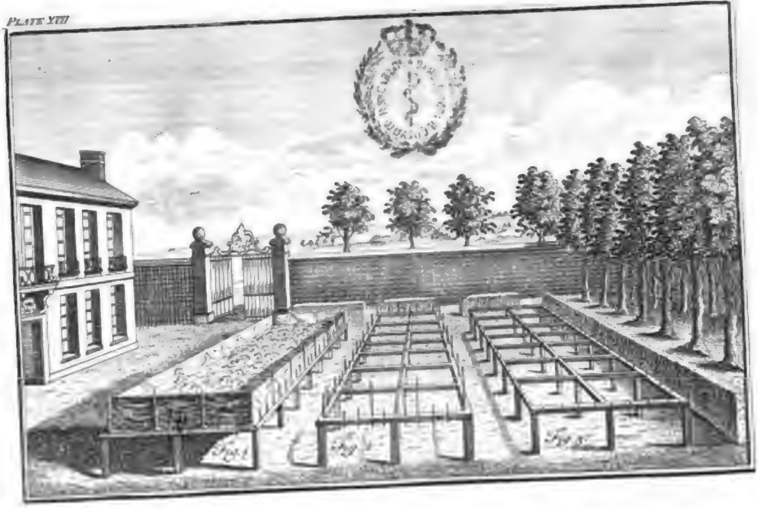


Fig. 1
Fig. 2
Fig. 3

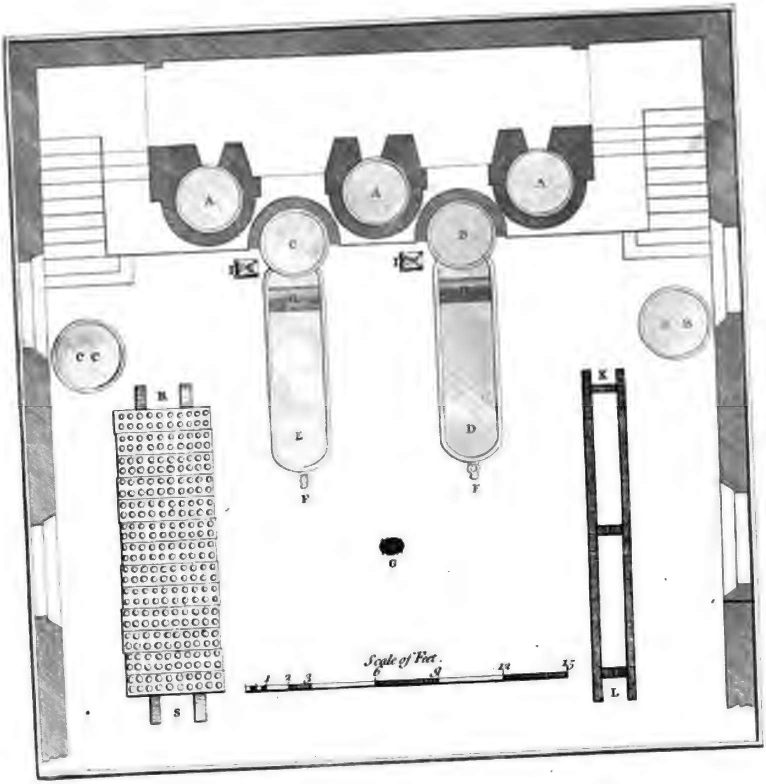

A
A
A
C
D
C C
B B
B
E
D
F
F
G
K
L
S
Scale of Feet.
1
2
3
6
9
12
15

PLATE XVIII.

Parting Bleaching of Wax

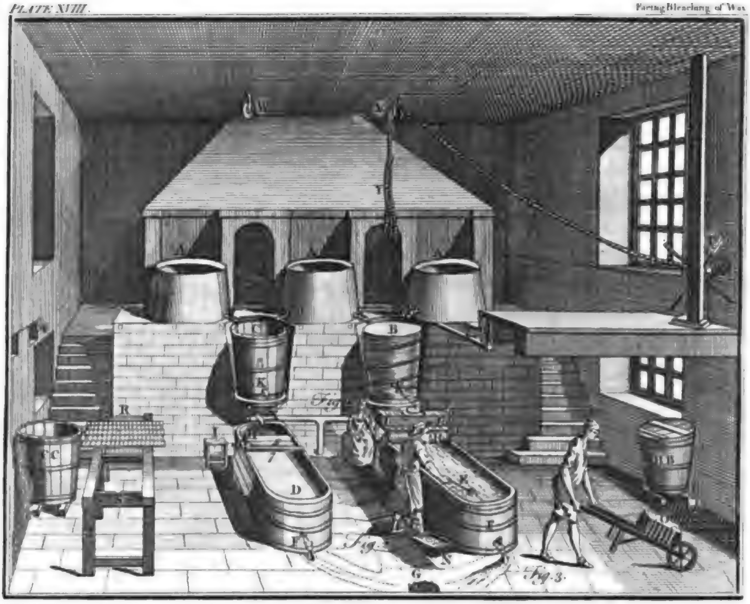

W
X
Y
A
C
B
K
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Fig. 2
Fig.
Fig. 3
HB

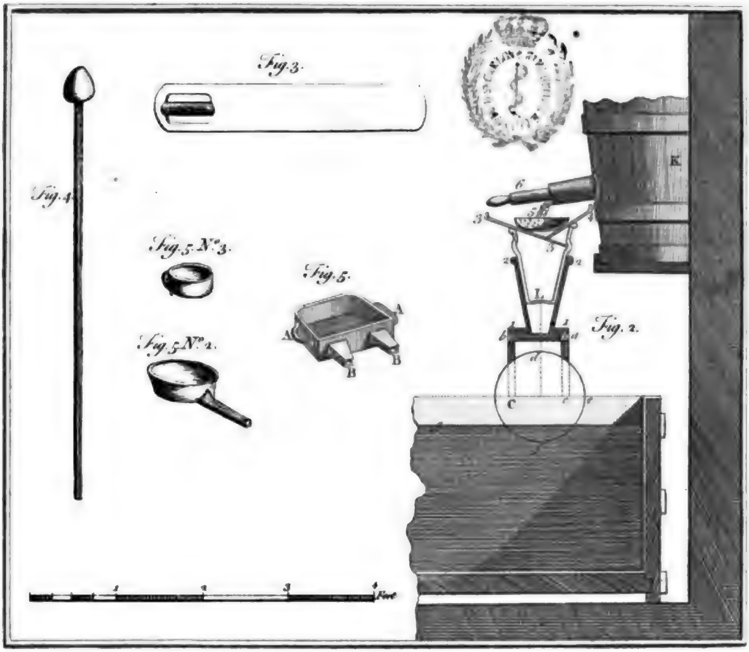


Fig. 3.
Fig. 4.
Fig. 5. N°. 3.
Fig. 5. N°. 2.
Fig. 5.
A
A
B
B
K
6
5
3
3
2
2
L
1
1
b
a
d
C
c
Fig. 2.
1
2
3
4
Feet

A, A, A, the coppers in which the wax is melted.

B, C, large tubs for receiving the wax from the coppers after it is melted, and where it ſtands to ſettle.

D, E, large veſſels in the form of bathing-tubs.

H, H, cylinders; that belonging to the tub E, is repreſented as turned round by the woman, *fig.* 1.

The figures 7, 8, in the tub D, repreſent a ſquare bar, and a board, extending from one ſide of the tub to the other. The bar 7 is faſtened to the ſides of the tub, in order to ſupport the board 8, which ſcrapes off the wax from the cylinder, when it is turned round in the tub. The other veſſel E has alſo a bar and board of the ſame kind, but are not expreſſed there, in order to ſhew the cylinder.

F, F, are cocks, through which the ſuperfluous water is conveyed out of the tubs to the ſink G.

R, S, a ſtand on which the board containing the moulds are placed.

T, an axis, furniſhed with four levers or ſtaves, on which the rope T V Y, paſſing over the pulley V, is wound, in order to hoiſt up the tub B, when its contents are drawn off into the veſſel E, and place the tub marked B B in its room. In order to this, three cords are faſtened to the end of the rope at Y, and fixed to three different ſtaves of the tub. The other tub C is alſo taken away in the ſame manner, and that marked C C, placed in its room, by means of a rope paſſing over the pulley W.

Fig. 2. repreſents a man employed in lading the granulated or rather laminated wax, out of the bathing-tub E, into the baſket N.

Fig. 3. another perſon wheeling away the wax in the baſket O, in order to convey it to the bleaching-yard.

Lower Compartment of Plate XVIII.

Fig. 2. is a ſection of that part of the contrivance by which the wax is laminated by means of the cylinder already deſcribed. K repeſents the tub B in the upper compartment, and which receives the melted wax from the coppers. C, the ſpigget. 5, a diſh pierced with a great number of holes, through which the melted wax flows. 3, 3, 4, one ſide of the ſupport of the diſh 5. 2, 2, the upper extremities of the ſection of a conical tube, ſupporting another of the ſame kind, having a hole L, through which the wax paſſes into the conical tube 2, 2, ſupported by the board 1 *b*, 1 *a*, and through a long and ſlender ſlit in which the wax is conveyed in a thin ſtream on the ſurface of the cylinder *d*, *e*. The dotted lines C, *c*, repreſent the manner in which the ſupporters *a*, *b*, are extended to the ſide of the tub *g*, as they cannot be ſeen becauſe of the cylinder *d*, *e*.

Fig. 3. A hand-board for placing the laminated wax on the cloths ſpread on the ſtages.

Fig. 4. An inſtrument for ſtirring the wax in the coppers while it is melting.

Fig. 5. A double funnel of copper tinned, with which the workmen fill the moulds when the wax is caſt into plates. A, A, two handles by which the funnel is lifted. B, B, the two apertures through which the wax runs into the moulds.

Fig. 5. Numb. 2. A funnel of copper well tinned. It is placed in the coppers A, A, A, in order to prevent their being entirely empty.

Fig. 5. Numb. 3. A copper pot tinned, for taking the melted wax out of the coppers, and pouring it into the double funnel.

BLEEDING, or **Blood-Letting**, the operation of taking blood from any part of the body, either by the lancet, leeches, or cupping. See Phlebotomy, Cupping, &c.

Dr. Pringle obſerves, that bleeding is the moſt indiſpenſable of all remedies in inflammatory diſeaſes; to the delaying of which too long, or not repeating it, are chiefly owing the bad conſequences of colds, as dangerous fevers, rheumatiſms, and conſumptions. He obſerves farther, that, in general, young practitioners are apt to be too ſparing in letting blood, by which means many lives are loſt: for a ſurgeon may be aſſured a ſoldier will never complain of a cough, or pains with inflammatory ſymptoms, wherein bleeding is not neceſſary; and from the ſizineſs of the blood, and continuance of the complaints, he is to judge of the neceſſity of repeating it, which, in caſe of a ſtitch, or difficult breathing, is never to be delayed. In inflammatory caſes, from twelve to fifteen ounces may be taken for the firſt bleeding, and ſomewhat leſs for all the reſt; and when it is neceſſary to exceed this quantity, it may be proper to follow Celſus's rule, in minding the colour of the blood whilſt it flows, and when it is of a blackiſh caſt, which is always the caſe in difficult breathing and great inflammations, to let it run till it becomes more florid. In all caſes where plentiful bleeding is indicated, it is beſt to do it in bed, to prevent fainting: and we may obſerve, that a perſon will bear the loſs of a much greater quantity of blood, if the ſtream is ſmall, than by a large orifice, which ſome have thought neceſſary for making a more ſpeedy revulſion.

Bleeding is highly neceſſary in the phrenitis, ophthalmia, quinſy, rheumatiſm, cough, hectic fits, and, in general, in all inflammatory caſes. *Pringle's Obſerv. on the Diſeaſes of the Army.*

It is to be obſerved, however, that, in malignant and putrid diſorders, bleeding frequently renders them more malignant, and therefore to be omitted, or at leaſt not repeated, unleſs there appear evident marks of inflammations.

Bleeding *at the Noſe*, an hæmorrhage from that organ of the body, owing to the more plentiful appulſe of blood to the noſtrils by a ſtronger motion of the heart, whereby the ſmall arteries in the pituitary coat become turgid, and too much diſtended, till at length they gape, and the blood ruſhes out.

A bleeding of the noſe may be promoted when perſons of ſedentary lives, that indulge their appetites, and ſo becomes plethoric, put their blood into extraordinary agitation by violent paſſions and exerciſe, by ſpirituous liquors, ſpices, heating, volatile medicines, hot baths, or ſuddenly chilling their feet.

Likewiſe the ſudden change of air from hot to cold, and cold to hot, by fits, eſpecially at the equinoxes, may cauſe this bleeding; as alſo when from cold and moiſt, the air becomes highly elaſtic, and *vice verſa*. Thoſe moreover are liable to it who are afflicted with rheumatic, nephritic, arthritic, and iſchiadic pains, or who have fevers or ſpaſms. It ſometimes happens before the eruptions of the ſmall pox and meaſles, and to thoſe who have loſt a large limb; or who labour under obſtructions of the liver and ſpleen; hence, in an inveterate ſcurvy, dropſy, and cachexy, there often happens a fatal hæmorrhage.

It differs much as to the quantity; ſome loſe only a few drops, ſome ſeveral ounces, and ſome five or ſix pounds. No hæmorrhage is more apt to return, which it does to ſome in a few days, to others in a few hours.

To the plethoric it is generally ſalutary; and there are many inſtances of a vertigo, a ſcotomia, dull, heavy pains of the head, phrenzy, and even an epilepſy, being carried off by a bleeding at the noſe. On the contrary, from its ſuppreſſion, there have ariſen vertigoes, apoplexies, epilepſies, convulſions, noiſe in the ears, and hardneſs of hearing, and even a gutta ſerena.

Theſe hæmorrhages are critical and ſalutary in a ſynechus on a ſemicritical day; that is, between the third fourth, or on a critical day, viz. the ſeventh; for as theſe fevers are generally cauſed by a plethora, they are carried off that way.

But enormous and long continued bleedings at the noſe, when they ariſe from ſpaſms of the internal parts, and are preceded with coldneſs of the extreme parts, and fainting fits, generally terminate in death.

In ſpotted and malignant fevers, attended with great loſs of ſtrength, it is exceeding dangerous. In chronical diſeaſes, wherein the viſcera are decayed, it is fatal, which often happens to the cachectic and hydropic.

When the blood and humours abound, and the blood, by an expanſive force and turgeſcency, hinders a free circulation through the ſmalleſt veſſels, and ſo brings on this hæmorrhage; which happens chiefly when the patient is young, in the vernal ſeaſon, after violent exerciſe, or from ſome ſtrong or ſpirituous liquors after it. After a revulſion by bleeding there is nothing equal to nitre to appeaſe the orgaſm of the blood, and to relax the ſpaſtic ſtricture. Next to theſe are vegetable acids, ſuch as the juice of Seville oranges, barberries, the water and juice of wood-ſorrel, but more eſpecially the diluted ſpirit of vitriol, tincture of roſes, made with the water of wood-ſorrel and the ſpirit of vitriol, and drank with ſpring-water. Five or ſix ſpoonfuls of the common tincture of roſes may be given at a time, and repeated as occaſion requires.

If the bleeding is very inordinate, it will be proper to uſe cooling emulſions, gentle or ſtrong opiates to moderate the ſpaſtic ſtrictures, as occaſion ſhall require. Camphire, mixed with nitre and calx of antimony, will be highly neceſſary, if the matter of exanthemata or cutaneous eruptions is the cauſe of the hæmorrhage, as is often the caſe.

A revulſion may be made from the head by bleeding in the lower parts; then by temperate pediluvia, and putting the hands into warm water.

As there is often an acrid bilious matter lodged in the hypochondria, the parent of wind and ſpaſms, the powder of rhubarb will be proper, mixed with a few grains of tartar vitriolate and nitre; as alſo emollient and carminative clyſters, with a due proportion of oil.

Externally, refrigerants may be mixed with diſcutients, and applied to the forehead, noſe and neck.

But it muſt be noted, that when the patient is plethoric, the bleeding muſt not be ſtopped haſtily, if at all; nor when the menſes in women have been ſuppreſſed, or the lochia, or the bleeding piles in men accuſtomed thereto; much leſs muſt a ſtoppage be attempted when the bleeding itſelf is periodical.

In perſons of a bilious conſtitution, cold water alone drank freely, has had a good effect.

BLEND-METAL *Iron*, a coarſe ſort of iron from Staffordſhire mines, uſed for making nails and heavy ware; in ſome places alſo for horſe-ſhoes.

BLEYME, in farriery, an inflammation in a horſe's hoof, occaſioned by blood putrified in the inner part of the coffin towards the heel, between the ſole and the coffin-bone.

There are three ſorts of bleymes; the firſt, bred in ſpoiled wrinkled feet with narrow heels, are uſually ſeated in the inward or weakeſt quarter; the ſecond, beſides the uſual ſymptoms of the firſt, infects the griſtle, and muſt be extirpated, as in the cure of a quitter bone; the third is occaſioned by ſmall ſtones and gravel between the ſhoe and the ſole. For a cure, they pare the foot, let out the matter, if any, and dreſs the ſore, like the prick of the nail.

BLIGHT. There is nothing ſo deſtructive to a fruit garden as blights; nor is there any thing in the buſineſs of gardening which requires more of our ſerious attention than the endeavouring to prevent or guard againſt this great enemy of gardens.

In order, therefore, to remedy this evil, it will be neceſſary firſt to underſtand the true cauſes of blights; and, although many curious perſons have attempted to explain the cauſes of them, yet very few of them have yet come near the truth, except the reverend and learned Dr. Hales, who hath, in his curious book, intitled Vegetable Statics, given us ſome accurate experiments upon the growth and perſpiration of plants; together with the various effects the air has upon vegetables; that by carefully attending thereto, together with diligent obſervations, we need ſeldom to be at a loſs how to account for the cauſes of blights whenever they may happen.

Blights are often cauſed by a continued eaſterly wind, for ſeveral days together, without the intervention of ſhowers, or any morning dew, by which the perſpiration of the tender bloſſoms is ſtopped; ſo that, in a ſhort time, their colour is changed, and they wither and decay: and if it ſo happens, that there is a long continuance of the ſame weather, it equally affects the tender leaves; for their perſpiring matter is hereby thickened, and rendered glutinous, cloſely adhering to the ſurfaces of the leaves, and becomes a proper nutriment to thoſe ſmall inſects, which are always found preying upon the leaves and tender branches of fruit-trees, whenever this blight happens.

The beſt remedy for this diſtemper, that I have yet known to ſucceed, is, gently to waſh and ſprinkle over the trees, from time to time, with common water; that is, ſuch as hath not had any thing ſteeped in it, and the ſooner this is performed, whenever we apprehend danger, the better; and, if the young and tender ſhoots ſeem to be much infected, waſh them with a woollen cloth, ſo as to clear them, if poſſible, from all this glutinous matter, that their reſpiration may not be obſtructed; and if we place ſome broad flat pans or tubs of water near the trees, that the vapours exhaled from it may be received by the trees, it will keep their tender parts in a ductile ſtate, and greatly help them; but whenever this operation of waſhing the trees is performed, it ſhould be early in the day, that the moiſture may be exhaled before the cold of the night comes on; eſpecially if the nights are froſty: nor ſhould it be done when the ſun ſhines very hot upon the wall, which would be ſubject to ſcorch up the tender bloſſoms.

Another cauſe of blights in the ſpring is, ſharp hoary froſts, which are often ſucceeded by hot ſun-ſhine in the day-time; which is the moſt ſudden and certain deſtroyer of fruits that is known: for the cold of the night ſtarves the tender parts of the bloſſoms, and the ſun riſing hot upon the walls before the moiſture is dried from the bloſſoms, which being in ſmall globules, collects the rays of the ſun, a ſcalding head is therefore acquired, which ſcorches the tender flowers, and other parts of the plants.

But there is another ſort of blight, againſt which it is very difficult to guard our fruit-trees; this is ſharp pinching froſty mornings, which often happen at the time when the trees are in flower, or while the fruit is very young, and occaſion the bloſſoms or fruit to drop off; and ſometimes the tender parts of the ſhoots and leaves are greatly injured thereby.

The only method yet found out to prevent this miſchief, is by carefully covering the walls, either with mats, canvas, reeds, &c. which being faſtened ſo as not to be diſturbed with the wind, and ſuffered to remain on during the night, by taking them off every day, if the weather permits, is the beſt and ſureſt method that hath yet been uſed in this caſe; which, although it has been ſlighted, and thought of little ſervice by ſome, yet the reaſon of their being not ſo ſerviceable as has been expected, was, becauſe they have not been rightly uſed, by ſuffering the trees to remain too long covered; by which means the younger branches and leaves have been rendered too weak to endure the open air, when they are expoſed to it; which has often proved of worſe conſequence to trees, than if they had remained entirely uncovered: whereas, when the covering beforementioned has been performed, as it ought to be, it has proved very ſerviceable to fruits; and many times, when there has been almoſt a general deſtruction of fruits in the neighbouring gardens, there has been a plenty of them in ſuch places where they have been covered; and though the expence of it may to ſome ſeem very great, yet, if theſe coverings are fixed near the upper part of the wall, and are faſtened to pullies, ſo as to be drawn up, or let down, it will be ſoon and eaſily done; and the ſucceſs will ſufficiently pay the trouble.

But there is another ſort of blight that ſometimes comes later in the ſpring, viz. in April or May, which is often very deſtructive to orchards, and open plantations, and againſt which we know no remedy. This is what is called a fire-blaſt, which, in a few hours, hath not only deſtroyed the fruit and leaves, but many times parts of trees, and ſometimes whole ones have been killed by it.

This is ſuppoſed to be effected by volumes of tranſparent flying vapours, which, among the many forms they revolve into, may ſometimes approach ſo near to an hemiſphere, or hemicylinder, either in their upper or lower ſurfaces, as thereby to make the beams of the ſun converge enough to ſcorch the plants or trees they fall upon, in proportion to the greater or leſs convergency of the ſun's rays.

The learned Boerhaave, in his Theory of Chemiſtry, obſerves, that thoſe white clouds, which appear in ſummer-time, are, as it were, ſo many mirrors, and occaſion exceſſive heat; theſe cloudy mirrors are ſometimes round, ſometimes concave, polygonous, &c. when the face of the heavens is covered with ſuch wild clouds, the ſun ſhining among them, muſt, of neceſſity, produce a vehement heat; ſince many of his rays, which would otherwiſe perhaps never touch our earth, are hereby reflected to us: thus, if the ſun be on one ſide, and the clouds on the oppoſite one, they will be perfect burning glaſſes.

I have ſometimes, continued he, obſerved a kind of hollow clouds, full of hail and ſnow; during the continuance of which, the heat was extreme; ſince, by ſuch condenſation, they were enabled to reflect more ſtrongly: after this came a ſharp cold, and then the clouds diſcharged their hail in great quantities; to which ſucceeded a moderate warmth. Frozen concave clouds, therefore, by their great reflections, produce a vigorous heat; and the ſame, when reſolved, exceſſive cold. Whence, as Dr. Hales obſerves, we ſee that blaſts may be occaſioned by the reflections of the clouds, as well as by the abovementioned refraction of denſe tranſparent vapours.

Againſt this enemy to fruits, &c. as hath been already ſaid, there is no guard to our plantations, nor any remedy to cure it: but as this more frequently happens in cloſe plantations, where the ſtagnating vapours from the earth, and the plentiful perſpirations from the trees, are pent in for want of a free air to diſſipate and diſpel them; which are often obſerved, in ſtill weather, to aſcend in ſo plentiful a manner, as to be ſeen by the naked eye, but eſpecially with reflecting teleſcopes, ſo as to make a clear and diſtinct object, become dim and tremulous, than in thoſe that are planted at a greater diſtance, or are not ſurrounded with hills or woods; this directs us, in the firſt planting of orchards, &c. that we ſhould allow a greater diſtance between the trees, and make choice of clear healthy ſituations, that the air may freely paſs between the trees, to diſſipate thoſe vapours before they are formed into ſuch volumes, whereby the circumambient air will be clear, and leſs ſubject to injuries; as alſo the fruits which are produced in this clearer air, will be much better taſted than thoſe that are ſurrounded with a thick rancid air; for as fruits are often in a reſpiring ſtate, ſo they conſequently, by imbibing a part of theſe vapours, are rendered crude and ill-taſted; which is often the caſe with a great part of our fruits in England. *Miller's Gard. Dict.*

BLIND, deprived of the ſenſe of ſight. See the article Blindness.

Blind is alſo uſed in ſpeaking of veſſels which are not perforated.

Thus the chemiſts ſay, a blind alembic; that is, one which has no aperture. A tube is ſaid to be a blind one, when it is cloſed at top.

Pore-Blind, or *Pur*-Blind, is ſaid of a perſon who is very ſhort ſighted.

Moon-Blind, denotes horſes that loſe their ſight at certain times of the moon; to cure which, take half an ounce of lapis calaminaris; heat it red-hot, and quench it in a quarter of a pint of plantain-water, or white-wine: to this add half a dram of aloes, and a ſpoonful of camphor, in powder; and letting them diſſolve, drop part of it into the horſe's eye.

Blind, among traders, a kind of falſe light which they have in their warehouſes and ſhops, to prevent too great a light from diminiſhing the luſtre of their linens and ſtuffs.

Blind, or Blinde, among mineraliſts, a kind of lead marcaſite; by our miners called mock-ore, mock-lead, and wild-lead.

It is a mineral maſs, flaky, gloſſy, and breaking in angles, much like the potters lead-ore, only of a colour more duſky, and approaching to black. In it are veins of a yellow ſhining marcaſite, with a little white ſpar, and on one ſide a greeniſh æruginous matter. On a trial by the fire, it yielded a very little copper, leſs lead, and no tin. It is very obſtinate, ſeveral attempts having been made with the alkaline fluxes to run it, in vain.

BLINDS, or Blindes, in the art of war, a ſort of defence commonly made of oziers, or branches interwoven, and laid acroſs between two rows of ſtakes, about five feet and a half high, and four or five feet aſunder; uſed particularly at the heads of trenches, when they are extended in front towards the glacis, ſerving to ſhelter the workmen, and prevent their being over-looked by the enemy.

BLINDNESS, a total privation of ſight, ariſing from an obſtruction of the functions of the organs of ſight, or from an entire deprivation of them.

The cauſes of blindneſs are various, proceeding from cataracts, gutta ſerenas, &c. There are alſo periodical blindneſs, as a defect of ſight in ſome towards night, in others only in the day; the former of which is termed nyctalopia, the latter hemeralopia. See the articles Nictalopia, &c.

Blindness, in farriery. See the article Eye.

BLOCKS, in naval affairs, little machines for the ropes to run in, which are ſo ſituated amongſt the rigging as to govern the moſt neceſſary mechaniſm aloft, ſuch as hoiſting, lowering, traverſing, and gathering or brailing up the ſails by hauling on certain ropes on deck: a block conſiſts of a piece of wood nearly oval, ſo hollowed as to receive an hollow-edged, cylindrical wheel called a ſheave, which is commonly made of lignum-vitæ, or other durable wood: perpendicular to the hollow of the block, and plane of the ſheave, there is a hole bored through both, ſo as to admit of a pin, which fills up the hole of the block, and leaves ſufficient room for the ſheave to be turned with great eaſe. Some blocks that are required to draw a greater ſtrain are fitted with two, three, or more ſheaves, and are called double, treble, fourfold, &c.

BLOCKADE, in the art of war, the blocking up a place, by poſting troops at all the avenues leading to it, to keep ſupplies of men and proviſions from getting into it; and by theſe means propoſing to ſtarve it out, without making any regular attacks.

BLOMARY, or Bloomary, in metallurgy, the firſt forge through which iron paſſes, after it is melted out of the ore.

BLOOD, *Sanguis*, a red liquor circulating through the arteries, veins, and other veſſels of animal bodies; and ſerving for the ſupport of life, and nouriſhment of all their parts.

Blood is the great ſource from whence all the other liquors of the body are derived; for the origin of which, ſee the article Sanguification.

Recent blood is equably fluid, and in taſte ſomewhat ſaline. Viewed by a microſcope, it appears compoſed of numerous red globules ſwimming in a tranſparent fluid.

On ſtanding for a little time, it ſeparates into a thick craſſamentum, and fluid ſerum. By agitation, it continues fluid: a conſiſtent polypous matter adheres to the ſtirrer, which, by repeated ablution with water, becomes white.

Received from the vein in warm water, it depoſites a quantity of tranſparent filamentous matter, the red portion continuing diſſolved in the water. On evaporating the fluid, a red powdery ſubſtance is left.

It congeals by froſt, and becomes fluid again by warmth: after the liquefaction it quickly putrefies. Fluid and florid blood, expoſed to a temperate air, putrefies ſooner than in ſuch as is more denſe.

Inſpiſſated to dryneſs, it leaves a dark coloured maſs, amounting at a medium to about one fourth the weight of the blood, of a dark colour, and a bitter ſaline taſte, eaſily inflammable, burning with a bluiſh flame. The exſiccated blood is not diſſoluble in acid or in alkaline liquors, but gives ſome tincture to water and to ſpirit of wine, and is more powerfully acted upon by dulcified ſpirit of nitre.

Recent blood is coagulated by the mineral acids, and by moſt of the combinations of them with earthy and metallic bodies. With vegetable acids, and with ſolutions of neutral ſalts, it mingles equably without coagulation. Alkalies, both fixed and volatile, render it more fluid, and preſerve it from coagulating.

The ſerum of blood is more ſaline than the craſſamentum, and does not ſo ſpeedily putrefy. It freezes with ſomewhat more difficulty than pure water, and its aqueous part evaporates, by a gentle warmth, ſomewhat more readily, leaving about one twelfth the weight of the ſerum of a ſolid yellowiſh pellucid matter. Expoſed to a heat a little greater than that of the human body, it coagulates into a ſolid maſs, without any conſiderable evaporation. Both this coagulum, and the inſpiſſated ſerum, are readily inflammable in the fire, not diſſoluble in water, or in ſpirit of wine, in acid, or in alkaline liquors.

Blood, in medicine, claims the moſt attentive regard of phyſicians. An exceſs of its quantity produces a plethora, lethargy, &c. Fevers are the conſequence of its too rapid motion, and obſtructions, of its viſcidity and languor.

The too great heat and viſcidity of the blood, are its prevailing diſorders in a country like this, where people live high, and drink hot inflammable liquors. Beſides temperance, and uſing water as beverage, the milder preparations of mercury contribute greatly to cool and dilute the blood: ſuch are æthiops and cinnabar, if given in moderate doſes, ſo as not to affect the ſtomach, or excite a ſalivation.

Thickneſs of the blood is another diſtemperature, proceeding from a plethora, and diminution of its motion; from whence ariſe obſtructions, ſtagnations, hypochondriac and hyſteric affections, &c. The incubus, or nightmare, is alſo owing to the ſame cauſe.

Spitting of **Blood** is cured by copious bleeding every third day, to the fourth time. Gentle purging is likewiſe recommended; and for appeaſing the commotion of the blood, ſpirit of vitriol, but more eſpecially the tincture of roſes made therewith. A milk diet is alſo preferable to any other; and after the cure is completed, it will be neceſſary, by way of prevention, to bleed once in ſix months for ſeveral years together.

Blood, in farriery, a diſtemper in the backs of cattle, which will make a beaſt go as if he drew his head aſide, or after him. In order to cure it, you ſhould ſlit the length of two joints under his tail, and ſo let him bleed well; but if he bleeds too much, knit his tail next the body, and then bind ſalt and nettles bruiſed unto it.

Blood *of Chriſt*, the name of a military order inſtituted at Mantua in 1608. The number of knights was reſtricted to twenty, beſides the grand maſter. Their device was *Domine probaſti me*, or *nihil, hoc, triſte, recepto*.

Blood *of Chriſt* is alſo the name of a congregation of nuns at Paris.

Blood-Spavin. See the article Spavin.

Blood-Stone. See Hæmatites.

Bloody-Flux. See the articles Flux and Dysentery.

Bloody-Hand is when a treſpaſſer is apprehended in a foreſt with his hands or other parts bloody; which is a circumſtance of his having killed the deer, though he be not found chaſing or hunting them.

BLOOM, a maſs of iron after having undergone the firſt hammering, called blomary. See the article Blomary.

BLOSSOM, denotes the flowers of plants, but more eſpecially of fruit-trees. See the articles Botany and Flower.

Blossom, or Peach-Coloured, in the menage, a term applied to a horſe that has his hair white, but intermixed all over with ſorrel and bay hairs. Such horſes are ſo inſenſible, and hard both in the mouth and the flanks, that they are ſcarce valued; beſides, they are apt to turn blind.

BLOW-PIPE, among jewellers and other artificers, is a glaſs tube, of a length and thickneſs at diſcretion, wherewith they quicken the flame of their lamp, by blowing through it with their mouth. It is uſed in works of quicker diſpatch, which do not need the bellows.

BLOWING *of a Flower*, among floriſts, an artificial proceſs, in order to bring a flower to diſplay itſelf with greater perfection and beauty than it would arrive at in the natural way of blowing. The uſual method is thus: About April, when the flower ſtems begin to put forth, or ſpindle, as the gardeners call it, they place by each flower a ſtraight ſtick, four feet long, and tie the ſpindles to it as they ſhoot. As ſoon as the flower-buds appear, they leave only one of the largeſt on each flower-ſtem to bloſſom: About ten days before the flowers open themſelves, the round-podded kinds will begin to crack their huſks on one ſide; when the careful gardener, with a fine needle, ſplits or opens the huſk on the oppoſite ſide to the natural fraction; and about three or four days before the complete opening of the flower, cuts off, with a pair of ſciſſars, the points on the top of the flower pod, and ſupplies the vacancies or openings on each ſide the huſk, with two ſmall pieces of vellum, or oil cloth, ſlipped in between the flower-leaves on the inſide of the huſk; by which means the bloſſom will diſplay its parts equally on all ſides, and be of a regular figure. Beſides this care, when the bloſſom begins to ſhew its colours, they uſe to ſhade it from the extreme heat of the ſun with a trencher-like board, or other device of the like nature, faſtened to the ſtick which ſupports it; for the flowers, as well as fruits, grow larger in the ſhade, and ripen and decay ſooneſt in the ſun.

Blowing *of Glaſs*, one of the methods of forming the divers kinds of works in the glaſs manufacture.

The workman dips his blowing-pipe into the melting-pot, and by turning it about, the metal ſticks to the iron more firmly than turpentine. This he repeats three times, which is called gathering; he then rolls the end of his inſtrument with the hot metal thereon, on a piece of poliſhed iron, and the workman perceiving there is metal enough on the pipe, claps his mouth immediately to the other end of it, and blows gently through the iron tube, till the metal lengthens like a bladder about a foot: then he rolls it on a marble ſtone a little while to poliſh it, and blows a ſecond time, by which means he brings it into the form of a globe, of about eighteen or twenty inches in circumference. This globe may be flattened by returning it to the furnace, and brought into any form by ſtamp-irons, which are always ready.

When the glaſs is thus blown, it is cut off at the collet or neck, which is the narrow part that ſtuck to the iron. The method of performing this is as follows: The pipe is reſted on an iron bar, cloſe to the collet; then a drop of cold water being laid on the collet, it will crack about a quarter of an inch, which with a ſlight blow, or cut with the ſhears, will immediately ſeparate the collet.

After this is done, the operator dips the iron-rod into the melting-pot, by which he extracts as much metal as ſerves to attract the glaſs he has made, to which he now fixes this rod at the bottom of his work, oppoſite to the opening made by the breaking of the collet. In this poſition the glaſs is carried to the great bocca, or mouth of the oven, to be heated, by which means it is again put into ſuch a ſoft ſtate, that by the help of an iron inſtrument it can be pierced, opened, and widened, without breaking. But the veſſel is not finiſhed till it is returned to the great bocca,where it being again heated thoroughly, and turned quickly about with a circular motion, it will open to any ſize, by the means of the heat and motion: and by this means we come to learn the cauſe why the edges of all bowls and glaſſes, &c. are thicker than the other parts of the ſame glaſſes; becauſe, in the turning it about in the heat, the edge thickens, and the glaſs being as it were doubled in that part, the circumference appears like a ſelvedge. If there remain any ſuperfluities, they are cut off with the ſhears; for, till the glaſs is cool, it remains in a ſoft flexible ſtate. It is therefore taken from the bocca, and carried to an earthen bench covered with brands, which are coals extinguiſhed, keeping it turning; becauſe that motion prevents its ſettling, and preſerves an evenneſs in the face of the glaſs; where as it cools, it comes to its conſiſtency, being firſt cleared from the iron-rod, by a ſlight ſtroke with the hand of the workman.

If the veſſel conceived in the workman's mind, and whoſe body is already made, requires a foot, or a handle, or any other member, or decoration, he makes it ſeparate, and now eſſays to join them with the help of the hot metal, which he takes out of the pot with his iron-rod: but the glaſs is not brought to its true hardneſs, till it has paſſed the leer or annealing oven.

Blowing *of Crown Glaſs*. The above method is applicable to the working of crown glaſs, till the blowing-iron or pipe has been dipped the third time; for then, inſtead of rounding it, the workman blows, and at the ſame time rolls or kneads the metal upon the iron plate, into the form of a cylinder. This cylinder is put again to the fire, and blown a ſecond time, and is thus repeated, till it is extended to the dimenſions required; the ſide to which the pipe is fixed diminiſhing gradually, till it ends in a conical form. While the glaſs is thus flexible, a ſmall piece of metal is added in the center, oppoſite to the pipe fixed to an iron-rod, and with a drop of cold water and a ſlight blow is knocked off from the pipe.

PLATE XV. Form. Blowing of Glass

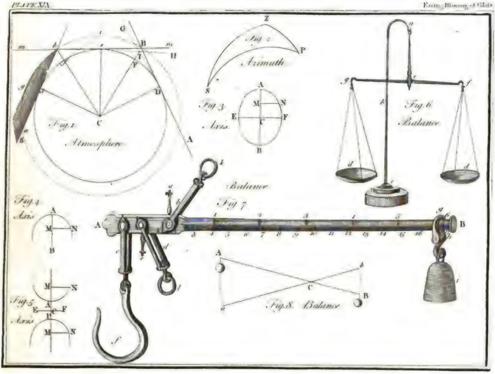


Fig. 1.
Atmosphere
m
b
G
B
m
H
I
F
D
C
A
a
Fig. 2
Azimuth
Z
P
S
Fig. 3.
Axis.
A
M
N
E
F
B
Fig. 6.
Balance
a
g
f
k
d
d
Balance
Fig. 7
A
B
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
f
l
Fig. 4.
Axis
A
M
N
B
Fig. 5.
Axis
M
N
E
F
M
N
Fig. 8. Balance
A
B
C
a
b

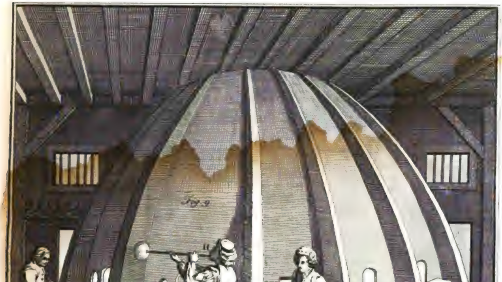


Fig. 9.
H
G
G
K
I
I
I

The cylinder, being now open at one end, is carried back to the flaſhing furnace, where the mouth or aperture of the cylinder is put to warm at the noſe hole, adjoining to the flaſhing furnace, and when at a proper degree of heat is opened on an inſtrument for that purpoſe in a circular form of about four or five inches diameter. This done, it is carried to the flaſhing furnace, where a briſk fire is continually kept, and by turning it quickly about in the fire in a circular motion, immediately opens and forms itſelf into a table glaſs, and by the aſſiſtance of a pair of ſhears, is cut off from the iron rod, which cauſes the knot or knob in the middle: this done, it is carried upon forks, and put into the annealing furnace, where it remains for thirty hours. In this furnace upwards of an hundred tables of glaſs may lie at a time without any injury to each other, by ſeparating them into tens, with an iron ſhiver between, which diminiſhes the weight by dividing it, and keeps the tables flat and even.

This was the method formerly made uſe of for making large plate glaſs, looking-glaſſes, &c. But the workmen by this method could never exceed fifty inches in length, and a proportional breadth; becauſe what were larger were always found to warp, which prevented them from regularly reflecting the objects, and wanted ſubſtance to bear the neceſſary grinding. Theſe imperfections have been removed by an invention of the Sieur Abraham Thevart, a Frenchman, about the year 1688, of caſting or running large plates of glaſs. See *Caſting of* Glass.

Plate XIX. *fig.* 9. is a perſpective view of a glaſs-houſe with the men at work blowing the glaſs. The furnace is of a circular form, and divided into three chambers. The large openings are called boccas or mouths, and the number of pots are always double to the number of boccas, that each workman may have one pot refined to work out of, while the other is refining. Theſe boccas are ſtopped up with moveable covers, while the metal is founding. On one ſide of the bocca, is a boccorella, or ſmall circular hole, out of which coloured glaſs is taken from the piling pot. G, G, G, are ſmall plates of iron, on which the finer or coloured glaſs taken out of the ſmall holes is kneaded. H, a man blowing a piece of glaſs. I, I, I, ſquare pieces of plate-iron, on which the glaſs is kneaded. K, another perſon cutting off a glaſs veſſel from the blowing-pipe with a pair of ſhears. L, a pair of ſhears.

For the manner of founding glaſs, and the materials of which it is compoſed; ſee the article Glass.

Blowing *of Tin* denotes the melting its ore, after being firſt burned to deſtroy the mundic.

BLUBBER denotes the fat of whales, and other large ſea animals, whereof is made train oil. See the article Oil.

BLUE, otherwiſe called Azure, is one of the primitive colours of the rays of light.

In oil and miniature, they alſo uſe indigo prepared; as alſo a fictitious ultramarine. See the articles Ultramarine and Indigo.

Turnſole Blue is uſed in painting on wood, and is made of the ſeed of that plant. The way of preparing it is, to boil four ounces of turnſole in a pint and a half of water, in which lime has been ſlacked.

Dyers Blue is one of their ſimple or mother colours, uſed in the compoſition of others. It is made of woad, indigo, and a paſtel brought from Normandy. Some dyers heighten their blue, by adding brazil and other woods. See Woad and Indigo.

A Blue *for painting or ſtaining of Glaſs.* Take fine white ſand twelve ounces, zaffer, and minium, of each three ounces; reduce them to a fine powder, in a bell-metal mortar; then putting the powder into a very ſtrong crucible, cover it and lute it well, and being dry, calcine it over a quick fire for an hour: take out the matter and pound it; then to ſixteen ounces of this powder, add fourteen of nitre powder; mix them well together, and put them into the crucible again; cover and lute it, and calcine for two hours on a very ſtrong fire.

Pruſſian Blue. This blue is next to ultramarine for beauty, if it be uſed in oil. This colour does not grind well in water. See Prussian-*Blue*.

Blue *Bice* is a colour of good brightneſs, next to Pruſſian blue, and alſo a colour of a body, and will flow pretty well in the pencil.

Saunders Blue is alſo of very good uſe, and may ſerve as a ſhade to ultramarine or the blue bice, where the ſhades are not required to be very deep, and is of itſelf a pleaſant blue, to be laid between the light and ſhades of ſuch a flower as is of a mazarine blue.

Lacmus, or *Litmus* Blue. This is a beautiful blue, and will run in a pen as free as ink. It is made of lacmus, and prepared thus: Take an ounce of lacmus, and boil it in a pint of ſmall beer wort, till the colour is as ſtrong as you would have it; then pour it off the liquor into a gallipot, and let it cool for uſe. This affords a beautiful colour, has extraordinary effects, and is a holding colour; if it be touched with aqua-fortis, it immediately changes to a fine crimſon, little inferior to carmine.

Blue *Japan.* Take gum-water, what quantity you pleaſe, and white lead a ſufficient quantity, grind them well upon porphyry; then take iſing-glaſs ſize, what quantity you pleaſe, of the fineſt and beſt ſmalt a ſufficient quantity, mix them well; to which add of your white lead, before ground, ſo much as may give it a ſufficient body; mix all theſe together to the conſiſtence of a paint.

Blueing *of Metals* is performed by heating them in the fire, till they aſſume a blue colour; particularly practiſed by the gilders, who blue their metals before they apply the gold and ſilver leaf.

BLUE-MANTLE, in heraldry, the title of a purſuivant at arms.

BLUENESS, the quality which denominates a body blue; or it is ſuch a ſize and texture of the parts which compoſe the ſurface of a body, as diſpoſe them to reflect the blue, or azure rays of light, and thoſe only to the eye.

As to the blueneſs of the ſkies, Sir Iſaac Newton obſerves, that all the vapours, when they begin to condenſe and coaleſce into natural particles, become firſt of ſuch a bigneſs as to reflect the azure rays before they conſtitute clouds or any other colour.

BLUNDERBUSS, a ſhort fire-arm with a wide bore, capable of holding a number of bullets at once.

BLUSHING, a ſuffuſion, or redneſs of the cheeks, excited by a ſenſe of ſhame, on account of a conſciouſneſs of ſome failing or imperfection.

Bluſhing is ſuppoſed to be produced from a kind of conſent or ſympathy between the ſeveral parts of the body, occaſioned by the ſame nerve being extended to them all. Thus the fifth pair of nerves, being branched from the brain to the eye, ear, muſcles of the lips, cheeks and palate, tongue and noſe, a thing, ſeen or heard, that is ſhameful, affects the cheeks with bluſhes, driving the blood into their minute veſſels, at the ſame time it affects the eye and ear. Mr. Derham further obſerves, upon this ſubject, that a ſavoury thing, ſeen or ſmelt, affects the glands and parts of the mouth; if a thing heard be pleaſing, it affects the muſcles of the face with laughter; if melancholy, it exerts itſelf on the glands of the eyes, and occaſions weeping, &c.

B MI, in muſic, the third note in the modern ſcale. See the article Scale.

BOARD, a long piece of timber, ſawed thin for building and ſeveral other purpoſes. See the article Timber.

Board is alſo uſed for an office under the government. Thus we ſay, the board of trade and plantations, the board of works, ordnance, &c.

Board, in navigation, the ſpace that a ſhip runs over in one tack, when turning againſt the wind. See Tacking.

BOARDING, in a naval engagement, a deſperate and furious aſſault made by one ſhip on another, after having found every other method to reduce her ineffectual: it may be performed in different places of the ſhip, according to their circumſtances and ſituation, by the aſſailant detaching a number of men armed with piſtols and cutlaſſes on the decks of his antagoniſt, who ſtands in the ſame predicament with a city ſtormed by the beſiegers. This expedient, however, is rarely attempted by king's ſhips, which generally decide the combat without grappling each other; but chiefly practiſed by privateers, which bearing down on their enemy's quarter or broadſide, drop from the bowſprit, which projects over the defendant's deck, an earthen ſhell, called a ſtink-pot, charged with fiery and ſuffocating combuſtibles, which immediately burſts, catches fire, and fills the deck with inſufferable ſtench and ſmoke: in the middle of the confuſion thus occaſioned, the privateer's crew ruſh aboard, under cover of the ſmoke, and eaſily over-power the aſtoniſhed enemy; unleſs they have cloſe quarters to which they can retreat and beat them off the deck. See Bowſprit, Close-Quarters. To prevent boarding, a high rope netting, extended along the ſhrouds from one end of the ſhip to the other, has been frequently uſed; but fraiſing a battalion with the fixed bayonets of the marines is, perhaps, more expedient.

BOATSWAIN *of a Ship*, the officer appointed to take care of the ſails, cables, rigging, boats, and anchors, to ſummon the crew to their duty, and direct them in the neceſſary buſineſs of the ſhip, and to puniſh delinquents.

BOB, a term uſed for the ball of a ſhort pendulum.

BOBBIN, a ſmall piece of wood turned in the form of a cylinder, with a little border jutting out at each end, bored through to receive a ſmall iron pivot. It ſerves to ſpin with the ſpinning wheel, or to wind thread, worſted, hair, cotton, ſilk, gold, and ſilver.

There are bobbins of ſeveral lengths and ſizes, according to the materials which are to be ſpun or wound. Thoſe uſed by the ſilk dealers, and the manufacturers in gold and ſilver, are thick ſhort bobbins; and ſo are thoſe uſed by the woollen manufacturers.

BOB-STAY, in naval affairs, a double rope paſſing through a ſhip's ſtem, or prow, and reaching up to the middle of the bow-ſprit, to which it is drawn very tight to ſecure and keep ſteady the bow-ſprit, which is alſo ſtrengthened by ſhrouds on each ſide; which are all very neceſſary, ſince the fore-maſt and the upper-part of the main-maſt are ſtayed and greatly ſupported by the bow-ſprit; for this reaſon the bob-ſtay is the firſt part of a ſhip's rigging ſet up, or drawn tight; to perform which the more effectually, it is uſual to ſuſpend a boat, or ſomething very weighty, at the bow-ſprit end.

BOCARDO, among the logicians, the fifth mode of the third figure of ſyllogiſms, in which the middle propoſition is an univerſal affirmative, and the firſt and laſt particular negatives; thus:

Bo Some ſickly perſons are not ſtudents;
car Every ſickly perſon is pale;
do. Therefore ſome perſons are pale that are not ſtudents.

BOCK-LAND, in the Saxons time, is what we now call freehold lands, held by the better ſort of perſons by charter or deed in writing, by which name it was diſtinguiſhed from folkland, or copy-hold land, holden by the common people without writing.

BODY, in philoſophy, a ſolid, extended, palpable ſubſtance; of itſelf merely paſſive, and indifferent either to motion or reſt, but capable of any ſort of motion, and of all figures and forms. Body is compoſed, according to the Peripatetics, of matter, form, and privation; according to the Epicureans and Corpuſcularians, of an aſſemblage of hooked heavy atoms; according to the Carteſians, of a certain quantity of extention; according to the Newtonians, of a ſyſtem or aſſociation of ſolid, maſſy, hard, impenetrable, immoveable particles, ranged or diſpoſed in this or that manner; whence reſult bodies of this or that form, diſtinguiſhed by this or that name.

That all bodies agree in one common matter, the ſchoolmen themſelves allow; making what they call the materia prima, to be the baſis of them all; and their ſpecific differences to ſpring from their particular forms: and ſince the true notion of body conſiſts either alone in its extenſion, or in that and impenetrability together, it will follow, that the differences, which make the varieties of bodies we ſee, muſt not proceed from the nature of mere matter, of which we have but one uniform conception; but from certain attributes, ſuch as motion, ſize, poſition, &c. which we call mechanical affections.

"We are as far, ſays Mr. Locke, from the idea of "ſubſtance of body, by the complex idea of extended, "figured, coloured, and all other ſenſible qualities, "which is all we know of it, as if we knew nothing at "all; nor after all the acquaintance and familiarity, "which we imagine we have with matter, and the many "qualities men aſſure themſelves they perceive and know "in bodies, will it, perhaps upon examination, be found, "that they have any more or clearer primary ideas be-"longing to body, than they have belonging to imma-"terial ſpirit. The primary ideas we have peculiar to "body, as contradiſtinguiſhed to ſpirit, are, the coheſion "of ſolid, and conſequently ſeparable parts; and a power "of communicating motion by impulſe. Theſe are the "original ideas proper and peculiar to body; for figure "is but the conſequence of finite extenſion." After which he goes on, and clearly proves the idea of the ſubſtance of ſpirit and body, equally clear and known to us.

Body, among painters, as to bear a body, a term ſignifying that the colours are of ſuch a nature, as to be capable of being ground ſo fine, and mixing with the oil ſo entirely, as to ſeem only a very thick oil of the ſame colour.

But ſuch colours as are ſaid not to bear a body, will readily part with the oil when laid on the work; ſo that when the colour ſhall be laid on a piece of work, there will be a ſeparation; the colour in ſome parts, and the oil in others, except they are tempered extraordinary thick.

Body, in the art of war, a number of forces, horſe and foot, united and marching under one commander.

Main Body *of an Army*, the troops encamped in the center between the two wings, and generally infantry; the other two bodies are the van-guard and the rear-guard: theſe being the three into which an army, ranged in form of battle, is divided.

Body *of Reſerve*. See Reserve.

BOG properly ſignifies a quagmire, covered indeed with graſs, but not ſolid enough to ſupport the weight of the body; in which ſenſe, it differs only from marſhes or fens, as a part from the whole: ſome even reſtrain the term bog to quagmires pent up between two hills; whereas fens lie in champaign and low countries, where the deſcent is very ſmall.

To drain boggy lands, a good method is, to make trenches of a ſufficient depth to carry off the moiſture; and if theſe are partly filled up with rough ſtones, and then covered with thorn buſhes and ſtraw to keep the earth from filling up the interſtices, a ſtratum of good earth and turf may be laid over all; the cavities among the ſtones will give paſſage to the water, and the turf will grow at top, as if nothing had been done. See the article Fen.

BOGOMILI, or Bogarmitæ, in church hiſtory, a ſect of heretics, which ſprung up about the year 1179. They thought that but ſeven books of the Scripture are to be received; that the uſe of churches, of the ſacrament of the Lord's ſupper, and all prayer, except the Lord's prayer, ought to be aboliſhed; that the baptiſm of Catholics is imperfect; that the perſons of the Trinity are unequal; and that they oftentimes made themſelves viſible to thoſe of their ſect. They ſaid, that the devils dwelt in the churches; and that Satan had reſided in the temple of Solomon from the deſtruction of Jeruſalem to their own time.

BOHEMIA, a kingdom ſubject to the houſe of Auſtria, bounded by Saxony on the north, by Poland and Hungary on the eaſt, by Auſtria on the ſouth, and by Bavaria and part of Saxony on the weſt.

BOIGUACU, the largeſt of all ſerpents, being from twenty-four to forty feet long, and thick in proportion. It is found in the Eaſt and Weſt Indies, where the Europeans, as well as the natives, are extremely fond of it as food.

The boiguacu is a very terrible animal, lying in ambuſh in thickets, or on trees; from whence it darts itſelf on its prey. Authors of credit tell us, that it will ſwallow a goat, a bear, and even a ſtag, horns and all.

BOILING, or Ebullition, in phyſics, the agitation of a fluid body, ariſing from the application of fire, &c. The phænomena of boiling may be thus accounted for: the minute particles of the fuel, being detached from each other, and impelled *in orbem* with a great velocity; that is, being converted into fire, paſs the pores of the containing veſſel, and mix with the fluid. By the reſiſtance they here meet, their motion is deſtroyed; that is, they communicate it wholly to the quieſcent water: hence ariſes, at firſt, a ſmall inteſtine motion in the water, and from the continued action of the firſt cauſe, the effect is increaſed, and the motion of the water continually accelerated; ſo that, by degrees, it becomes ſenſibly agitated: but now the particles of fire, ſticking on thoſe in the loweſt ſurface of the water, will not only give them an impulſe upwards, contrary to the laws of equilibrium, but will likewiſe render them ſpecifically lighter than before, ſo as to determine them to aſcend according to the laws of equilibrium; and this, either by inflating them into little veſicles, by the attraction of the particles of water around them, or by breaking and ſeparating the little ſpherules of water, and ſo increaſing the ratio of their ſurface to their ſolid content. There will be, therefore, a conſtant flux of water, from the bottom to the top of the veſſel, and conſequently a reciprocal flux from the top to the bottom; that is, the upper and under water will change places: and hence we have the reaſon of that phænomena of the water being hot at top, ſooner than at bottom.

Again, an intenſe heat will diminiſh the ſpecific gravity of water, ſo as not only to make it mount in water, but alſo in air: whence ariſe the phænomena of vapour and ſmoke, though the air, incloſed in the interſtices of the water, muſt be allowed a good ſhare in this appearance; for that air, being dilated, and its ſpring ſtrengthened by the action of the fire, breaks its priſon, and aſcends through the water into the air, carrying with it of the contiguous ſpherules of water, ſo many as ſhall hang in its villi, or as can adhere immediately to it.

The particles of the air, in the ſeveral interſtices of the fluid maſs thus expanded and moving upwards, will meet and coaleſce in their paſſage; by which means great quantities of the water will be heaved up and let down alternately, as the air riſes up, and again paſſes from the water; for the air, after coalition, though it may buoy up a great heap of water by its elaſticity, while in the water, yet cannot carry it up with itſelf into the atmoſphere; ſince, when once got free from the upper ſurface of the water in the veſſel, it will unbend itſelf in the atmoſphere, and ſo its ſpring and force become juſt equal to that of the common unheated air: and hence we ſee the reaſon of the principal phænomena of boiling, viz. the fluctuating of the ſurface of the water.

The ingenious Mr. Amenton has ſhewn, that water heated to a degree of boiling, will not conceive any further heat, how much ſoever the fire be increaſed: yet this excellent diſcovery may receive a conſiderable improvement from what Mr. Fahrenheit has obſerved, viz. that the heat of the ſame boiling water is always regularly greater, by how much the weight of the atmoſphere is greater which preſſes upon its ſurface: and again, that the ſame heat of the boiling water diminiſhes, as the weight of the incumbent atmoſphere grows leſs. Hence, in marking the degree of heat in boiling water, it will be neceſſary to note the weight of the atmoſphere at the ſame time by the barometer; otherwiſe no certain meaſure will be expreſſed. In the mean time, however, it muſt be allowed, that ſo long as the preſſure of the atmoſphere continues the ſame, boiling water will not grow hotter by any increaſe of fire whatever; and with this limitation, Mr. Amenton's rule will for ever hold true. When the difference of the weight of the atmoſphere is three ounces, the greateſt degree of heat in boiling water, under theſe different weights, will be eight or nine degrees: from whence the author evidently deduces, that by how much the particles of water are more compreſſed to each other, upon increaſing the incumbent weight by ſo much the more fire, is required to make them recede from each other, wherein ebullition conſiſts. Hence alſo he concluded, that a thermometer applied in boiling water, would mark, by the degree of heat it expreſſes, the gravity of the atmoſphere at that time.

BOLES, a genus of earths, moderately coherent; ponderous, ſoft, and not ſtiff and viſcid; compoſed of fine particles, ſmooth to the touch, eaſily breaking between the fingers, readily diffuſible in water, and freely and eaſily ſubſiding from it.

Three kinds of boles are ranked among medicinal earths, Armenian, red, and white. That met with in the ſhops, under the name of Armenian, is not the produce of Armenia, or any of the oriental countries; but, like the others, of different parts of Europe, as Bohemia, Sileſia, Saxony, Hungary, Tranſylvania, France, Norway, &c. The French employ chiefly the bole of Blois. We need not be ſolicitous about the particular place where any of the boles have been dug, provided they are pure and of a good quality.

Bole *Armenic* is of a pale colour, between red and yellow, ſmooth and ſlippery to the touch, ſomewhat gloſſy, pure from ſand or any perceptible gritty matter. It readily crumbles betwixt the fingers, and adheres to the tongue. Softened with water, it forms a ſmooth paſte: diluted with a larger quantity of water, it remains for a conſiderable time ſuſpended.

This earth contains, beſides the purely argillaceous, a ſmall portion of one of a different claſs, which is extracted from it by acids. In each of the following experiments were employed ſixty grains of the bole. Spirit of vitriol diſſolved eight grains: the ſolution was clear; the dried reſiduum grey. Spirit of nitre diſſolved five grains; the ſolution appeared ſlightly yellowiſh; the reſiduum yellowiſh grey. Spirit of ſalt, ſeven grains: the ſolution not green, as Ettmuller relates, but of a gold yellow; the reſiduum of a pale ſulphur yellow. Diſtilled vinegar diſſolved but two grains; the ſolution was clear, but taſted bitteriſh, whilſt thoſe made in the mineral acids were ſweetiſh; the reſiduum unchanged. Rheniſh wine had the ſame effect as diſtilled vinegar, except that the liquor proved in taſte leſs bitter. Freſh citron juice diſſolved five grains; the liquor was clear, thickiſh, and had a kind of vitriolic taſte; the reſiduum unchanged. Alkaline lixivia diſſolved nothing; but the bole was found to have abſorbed a part of the alkali, appearing when dried of a darker colour, and weighing fifteen grains, or one fourth, more than at firſt. Spirit of ſal ammoniac, on the other hand, diſſolved two grains of the bole; the reſiduum unchanged. Lime-water had no effect. Rectified ſpirit of wine took up four grains, without occaſioning any further alteration.

Four ounces of bole armenic, diſtilled in a glaſs retort in an open fire, yielded three drams of a ſaline phlegm, which ſmelled a little urinous, and changed ſyrup of violets green. In the neck of the retort was found a little powdery ſaline matter, which had an ammoniacal taſte, but was in too ſmall quantity to be collected or further examined.

Bole armenic, like moſt of the other coloured earths, contains a portion of ferrugineous matter, to which its colour is owing, and which may be ſeparated by the magnet, after the bole has been calcined with oil or other inflammable matters. It is likewiſe impregnated with vitriolic acid; and hence, when mixed with nitre or ſea-ſalt, it extricates the acids of thoſe ſalts in the fire: it was probably by the acid of the bole, that the alkaline ſalt was abſorbed and detained.

This earth is employed medicinally as a ſtyptic, both internally and externally; a virtue which ſeems to proceed from its ferrugineous impregnation: to the antipeſtilential and alexipharmac qualities, for which it has long been celebrated, it has no pretence; and the foregoing experiments ſufficiently evince, that the abſorbent ones, which ſome aſcribe to it, have no juſt foundation. It is prepared or purified by waſhing it over with water; the pure bole remaining ſuſpended a conſiderable time, ſo as to be poured off with the liquor, whilſt the ſandy or other groſſer matter remains behind: after the bole has ſettled from the water, it is moderately dried, formed into rolls or cakes, and afterwards further exſiccated for uſe. Some have condemned this method of purification, as depriving the bole of a certain central ſalt: but this earth contains nothing that water is capable of extracting. Bole armenic, treated with water, remained undiminiſhed in weight; and neither the bole or the water received any ſenſible alteration.

Red **Bole**. The common ſort of this earth is coarſer than the Armenian, and participates more largely of iron: hence it is never given internally, unleſs to cattle. I examined it in the ſame manner as the Armenian; employing, with each menſtruum, ſixty grains of earth. Spirit of vitriol diſſolved five grains: the ſolution taſted like vitriol of iron; its colour was white, that of the remaining bole browniſh grey. Spirit of nitre diſſolved ſeven grains: the ſolution was yellowiſh, and of a vitriolic taſte; the reſiduum yellowiſh brown. Spirit of ſalt diſſolved ſix grains: the liquor a deep yellow, and of a vitriolic taſte; the reſiduum yellowiſh white. Diſtilled vinegar took up but three grains: the liquor clear and ſweetiſh, the reſiduum rather darker coloured than the bole was at firſt. Citron juice extracted five grains, and left the bole ſomewhat paler: the liquor had an earthy kind of taſte. Rheniſh wine diſſolved no more than one grain: the remaining bole unchanged. A ſtrong fixed alkaline lixivium received no tincture from the bole, but was in part abſorbed by it; the dried matter weighing twelve grains more than the earth employed; its colour was ſomewhat darker. Spirit of ſal ammoniac diſſolved two grains: the liquor was clear; the remaining bole ſomewhat darker. Lime-water diſſolved three grains. Rectified ſpirit of wine two grains. Common water had not the leaſt effect.

Four ounces of red bole, diſtilled in an open fire, yielded two drams and a half of urinous phlegm, the remaining bole preſerving its original colour. On previouſly digeſting the bole with a ſaturated alkaline lixivium, ſomewhat more of the urinous matter was produced, and the diſtilled liquor had a volatile ſmell; an experiment which may deſerve further conſideration.

White **Bole** is brought to us ready waſhed and formed into large rolls or cylindric globes, not of a chalky whiteneſs, but rather of an aſh-colour. Formerly it came only from Tuſcany, or the Iſland Elva: at preſent it is ſupplied chiefly from Norway, the Iſland Bornholm, or places nearer home. It differs from the two preceding in containing no manifeſt irony matter, and conſequently in wanting their aſtringency. It has been recommended as an abſorbent; but experiments made upon it with acids, ſhew that it little deſerves that character, any more than the other boles. Some have a method of recovering the luſtre of pearls, eſpecially the Scotch ones, by warming them a little over the fire, and rubbing them with powdered white bole.

Out of ſixty grains of this kind of bole, ſpirit of vitriol diſſolved four grains: the ſolution was clear, and had ſcarce any vitriolic taſte; the reſiduum grey. Spirit of nitre diſſolved ſix grains: both the liquor and the reſiduum looked yellowiſh. Spirit of ſalt, five grains: both the menſtruum and the bole unaltered in colour. Diſtilled vinegar, two grains: the liquor clear, the bole unaltered. Citron juice, ſix grains: the ſolution taſted bitteriſh; the earth looked ſomewhat darker. Rheniſh wine took up nothing, but ſomewhat darkened the colour. Fixed alkali was in part retained, as by the other boles; increaſing the weight ten grains, or one ſixth. Spirit of ſal ammoniac diſſolved three grains; the liquor appeared tinged a little; the bole ſomewhat darker. Lime-water diſſolved two grains; the liquor clear, the bole unchanged. Rectified ſpirit of wine diſſolved four grains, and left the bole unaltered. Pure diſtilled water took up three grains; but the part diſſolved gradually, fell down again, not in the form of powder, but, what is pretty remarkable, in flakes reſembling a kind of mouldineſs.

Four ounces of white bole yielded in diſtillation only one dram and a half of a yellowiſh phlegmatic liquor, which ſmelled ſomewhat empyreumatic, and changed ſyrup of violets green: the caput mortuum was grey. *Neumann's Chemiſtry.*

BOLLITO, a name by which the Italians call a ſea-green colour in artificial cryſtal. To prepare this colour, you muſt have in the furnace a pot filled with forty pound of good cryſtal, firſt carefully ſkimmed, boiled, and purified, without any maganeſe: then you muſt have twelve ounces of the powder of ſmall leaves of copper, thrice calcined, half an ounce of zaffer in powder: mix them together, and put them at four times into the pot, that they may the better mix with the glaſs, ſtirring them well each time of putting in the powder, for fear that it ſhould ſwell too much and run over.

BOLONIAN, in general, ſomething belonging to Bologna. Hence

Bolonian *Stone* is a ſulphureous kind of ſtone, about the bigneſs of a walnut, found near Bologna; which, when duly prepared by calcination, makes a ſpecies of phoſphorus. See Phosphorus.

BOLSTERS, in naval affairs, a ſort of ſmall cuſhions, ſtuffed with tarred canvas, laid between the collar, or lower-part of the main-ſtay, and the upper-part of the ſtem, to prevent the ſtay from being fretted or galled by rubbing when the ſhip pitches at ſea,

Bolsters *of a Saddle*, thoſe parts of a great ſaddle which are raiſed upon the bows, both before and behind, to hold the rider's thigh, and keep him in a right poſture.

BOLT, among builders, an iron faſtening fixed to doors and windows. They are generally diſtinguiſhed into three kinds, viz. plate, round, and ſpring bolts.

Bolts, in gunnery, are of ſeveral ſorts, as 1. Tranſum bolts that go between the cheeks of a gun-carriage, to ſtrengthen the tranſums. 2. Priſe bolts, the large knobs of iron on the cheeks of a carriage, which keep the handſpike from ſliding, when it is poizing up the breech of a piece. 3. Traverſe bolts, the two ſhort bolts that, being put one in each end of a mortar carriage, ſerve to traverſe her. 4. Bracket bolts, the bolts that go through the cheeks of a mortar, and by the help of quoins keep her fixed at the given elevation. And 5. Bed bolts, the four bolts that faſten the brackets of a mortar to the bed.

Bolt *of Canvas*, in commerce, the quantity of twenty-eight ells.

Bolt-Rope, in naval affairs, a rope paſſing round the ſail, to which the edges of it are ſewed to prevent the ſail from tearing: the bottom-part of it is called the foot-rope, the ſides leeches, and if the ſail be oblong or ſquare, the upper-part is called head-rope.

BOLTERS, or **Boulters**, a kind of ſieves for meal, having the bottoms made of woollen, hair, or even wire.

BOLTING, or **Boulting**, the act of ſeparating the flour from the bran, by means of a ſieve or bolter.

Bolting-Mill, a verſatile engine for ſifting with more eaſe and expedition. The cloth round this is called the boulter.

BOLUS, an extemporaneous form of a medicine, ſoft, coherent, a little thicker than honey, the quantity of which is a little morſel or mouthful; for which reaſon it is by ſome called buccella.

BOLZAS, a ſort of ticking which comes from the Eaſt-Indies.

BOMB, in military affairs, a large ſhell of caſt-iron, having a great vent to receive the fuſee, which is made of wood.

To prove whether the ſhell be ſound after heating it red-hot on the coals, it is expoſed to the air, ſo as to cool gently; for, ſince fire dilates iron, if there be any chinks or perforations, they will thus be opened and enlarged; becauſe of the ſpring of the included air continually acting within. This done, the cavity of the globe is filled with hot water, the aperture well ſtopped, and the outer ſurface waſhed with cold water and ſope: ſo that, if there be the ſmalleſt leak, the air, rarified by the heat, will now perſpire, and form bubbles on the ſurface.

If no defect be thus found in the globe, its cavity is filled with whole gunpowder; a little ſpace or liberty is left, that when a fuſee or wooden tube, of the figure of a truncated cone, is driven thro' the aperture, and faſtened with a cement made of quick-lime, aſhes, brick-duſt, and ſteel filings, worked together in a glutinous water; or, of four parts of pitch, two of colophony, one of turpentine, and one of wax; the powder may not be bruiſed. This tube is filled with a combuſtible matter, made of two ounces of nitre, one of ſulphur, and three of gunpowder-duſt, well rammed.

This fuſee, ſet on fire, burns ſlowly, till it reaches the gunpowder, which goes off at once, burſting the ſhell to pieces with incredible violence; whence the uſe of bombs in beſieging towns.

Special care, however, muſt be taken, that the fuſee be ſo proportioned, as that the gun-powder do not take fire before the ſhell arrives at the deſtined place; to prevent which, the fuſee is frequently wound round with a wet clammy thread.

A bomb, thrown out of a mortar eighteen inches one-third diameter, contains twelve pounds of powder in its chamber. Its thickneſs is two inches all over, except at the breech, where it is two inches five-ſixths thick.

Bomb-Chest, a kind of cheſt filled uſually with bombs, ſometimes only with gunpowder, placed under ground to tear and blow it up in the air, with thoſe who ſtand on it. It is ſet on fire by means of a fanciſſe faſtened at one end, but is now much diſuſed.

Bomb-Battery, the ſame with battery of mortars. See Battery.

BOMBARD, a piece of ordnance anciently in uſe; exceedingly ſhort and thick, and with a very large mouth. There have been bombards which have thrown a ball of three hundred weight. They made uſe of cranes to load them.

The bombard is by ſome called baſiliſk, and by the Dutch, donderbuſs.

BOMBARDIER, a perſon employed about a mortar. His buſineſs is to drive the fuſee, fix the ſhell, load and fire the mortar, and to work with the fire-workers on all ſorts of fire-works, whether for war or recreation.

BOMBARDING, the act of attacking a city or fortreſs, by throwing bombs into it, in order to ruin or ſet on fire the houſes and magazines, and do other miſchiefs.

BOMBARDO, a muſical inſtrument of the wind kind, much the ſame as the baſſoon, and uſed as a baſs to the hautboy.

BOMBASINE, in commerce, a kind of ſilk-ſtuff manufactured at Milan, and thence ſent into France and other countries.

BOMBAST, in matters of literature, a high ſtyle made up of hard words, with little meaning, and leſs ſenſe.

BOMBAX, the cotton tree, in botany. See the article Cotton.

BOMBUS, in medicine, a reſounding and ringing noiſe in the ear, which is accounted by Hypocrates a mortal ſymptom in acute diſeaſes.

BOMBYLIUS, in natural hiſtory, the name of the common humble-bee, of which we have a great variety of ſpecies, many of them very beautiful.

BOMBYLOPHAGES, in the hiſtory of inſects, humble-bee-eater, the name of a fly of the tipula kind, which is larger and ſtronger than the common kinds; and loving honey, without knowing how to extract it from the flowers, it ſeizes on the humble-bees, and deſtroys them, in order to get the bag of honey which they contain. It is of a blackiſh colour in the body; its head is of a bright red, and the eyes very large and prominent. It is chiefly found in mountainous places.

BOMONICI, in Grecian antiquity, young men of Lacedæmon, who contended at the ſacrifices of Diana, which of them was able to endure moſt laſhes; being ſcourged before the altar of this goddeſs.

BONA-FIDES, or Bona-Fide, among lawyers, it is as much as to ſay, ſuch a thing was done really without either fraud or deceit.

A man is ſaid to poſſeſs any thing *bona fide*, who is ignorant of that thing's being the property of another; on the contrary, he is ſaid to poſſeſs a thing *mala fide*, who is conſcious of its being the property of another.

Bona-Mobilia, the ſame with moveable goods or effects.

Bona-Notabilia, are ſuch goods as a perſon dying has in another dioceſe, than that wherein he dies, amounting to the value of five pounds at leaſt: in which caſe the will of the deceaſed muſt be proved, or adminiſtration granted in the court of the archbiſhop of the province, unleſs by compoſition, or cuſtom, any dioceſes are authoriſed to do it, when rated at a greater ſum.

Bona-Patria, an aſſize of countrymen, or good neighbours, where twelve or more are choſen out of the country to paſs upon an aſſize, being ſworn judicially in the preſence of the party.

BONANA, in botany, a genus of plants, otherwiſe called muſa. See Musa.

BONASUS, in zoology, a ſpecies of wild ox, very thick and bulky, and furniſhed with a mane like a horſe.

The bonaſus is a very unwieldy animal, being larger than our bull; the horns are but ſhort, and ſo turned as to be unfit for wounding: the noſtrils are wide, and the ears long and broad. The colour of the animal is a deep tawny; only the forehead and the breaſt are white, and the mane is of a darker colour than that of the reſt of the body. When purſued, it does not attempt to defend itſelf with its horns, but kicks, and diſcharges its dung to a great diſtance againſt the purſuers.

BOND, a deed, by which a perſon obliges himſelf to perform certain acts; ſuch as to pay a certain ſum, or to anſwer for another, or to ſerve an apprenticeſhip with a maſter.

In England, a bond is a deed or obligatory inſtrument in writing, whereby a perſon binds himſelf to another, to pay a ſum of money, or to do ſome other act, as to make a releaſe, ſurrender an eſtate, for quiet enjoyment; to ſtand to an award, ſave harmleſs, perform a will, &c. It contains an obligation with a penalty annexed, and a condition which expreſsly mentions what money is to be paid, or what other things are to be performed, and the limited time for the performance thereof, for which the obligation is peremptorily binding.

It may be made upon parchment or paper, though it is uſually on paper, and be either in the firſt or third perſon: and the condition may be either in the ſame deed or in another; and ſometimes indorſed upon the obligation; but it is commonly at the foot of the obligation.

BONE, in anatomy, a hard, brittle, inſenſible part of the body, affording form and ſupport to the whole machine.

External Parts of a Bone. — The external parts of a bone may be divided into one principal, which is as it were the body of the bone; and into four ſubordinate claſſes termed regions, eminences, riſings, cavities, and inequalities.

The principal part of a bone is commonly termed its body, which has been defined to be the middle hardeſt portion, at which the oſſification of that bone begins.

But this definition will not hold univerſally.; the bodies of the vertebræ, for inſtance, are neither the middle nor hardeſt parts of them, and the oſſification of the oſſa innominata does not begin at that portion, which is the principal part of them in an adult body.

Eminences of a Bone.—By the eminences of a bone, we underſtand all ſorts of riſings, prolongations or productions obſervable on its ſurface.

Theſe are of two kinds; in the firſt, the riſings are continuous with the reſt of the bone, and make one piece with it; in the other, they are as it were contiguous only, appearing to be parts added to, or united with, the body of the bone.

The riſings of the firſt kind are termed apophyſes, from a Greek word, ſignifying an excreſcence; becauſe they grow or ſhoot out immediately from the bone itſelf; ſuch are the ſharp eminences of the lower jaw, &c.

The others are named epiphyſes, or appendices, becauſe they appear to be parts added to the reſt of the bone, and ſtill diſtinguiſhed from it by the intervention of another ſofter ſubſtance called a cartilage, the thickneſs of which diminiſhing with age, it becomes at laſt almoſt inſenſible, and is oftentimes quite loſt; ſo that what was an epiphyſis in a child, has the true appearance of an apophyſis in a perſon full grown; as we ſee in the extremities of the os humeri, bones of the leg, &c.

External Cavities of a Bone. — By cavities I mean all the depreſſions perceivable in the outſides of bones. Theſe are in great numbers; very different from one another, and they are called by many different names.

They may however be diſtinguiſhed into two general kinds; thoſe which receive ſoft parts, as the cavities which contain the brain, the eyes, the marrow, &c. and thoſe which receive hard parts; that is, where the cavity of one bone contains the eminence of another. Theſe laſt are either deep or ſuperficial.

Of the deep cavities, ſome are termed cotylæ, or cotyloide, from the reſemblance they bear to a veſſel of that name with which the ancients meaſured liquors; ſuch as the great cavity in the oſſa innominata, which receives the head of the os femoris. Others are named alveoli or ſockets, as thoſe in which the teeth are lodged.

The more ſhallow cavities are termed glenæ or glenoide, from an ancient Greek word; ſuch is that of the ſcapula, which receives the head of the os humeri in the ſkeleton. I ſay, in the ſkeleton, becauſe in freſh ſubjects, this cavity is deeper. Theſe ſuperficial cavities have ſcarce any ſenſible depth, as thoſe in moſt of the vertebræ, in ſome bones of the carpus, tarſus, &c. Some of them are double, as in the upper extremity of the tibia.

Subſtance of Bones.—The ſubſtance of bones is found on examination to be a texture of ſolid fibres differently diſpoſed, according to the particular conformation of each bone. Theſe bony fibres are eaſily diſtinguiſhed on the ſurface of the ribs, where they may be ſeparated much after the ſame manner as we do thoſe of whale-bone or horn. We may likewiſe diſcover them by the fiſſures in bones, which have been long expoſed to the ſun or air, or any otherwiſe dried.

In general theſe fibres are ſo diſpoſed, as to form in ſome bones laminæ of a conſiderable extent; in ſome, little plates or ſmall portions of the forementioned laminæ; and in others, filaments of different ſizes.

The general ſtructure of the ſubſtance of bones conſiſts in this diſpoſition; and their ſubſtance is partly compact or ſolid, partly cellulous or ſpongy, and partly reticular.

The ſolid part lies chiefly towards the outſide of bones, the cellulous part toward the inſide. The firſt is moſt conſiderable in the large hollow bones, the other in thoſe which have no remarkable cavities.

The ſolid part is formed by laminæ, diſpoſed in different ſtrata. The ſpongy part conſiſts chiefly of the plates and filaments variouſly interwoven: the filaments alone form the reticular texture principally obſervable in the long hollow bones.

We may be convinced, that the ſolid part of bones is made up of different ſtrata of laminæ, cloſely joined together, by examining broken bones, thoſe that have been long expoſed to the air, rain, or ſun, thoſe that have been calcined by fire to a certain degree, or thoſe that have been ſoftened by long and violent boiling, as in Papin's Digeſter.

And even without the help of ſuch preparations, the laminæ in ſome bones may be ſeen through a good microſcope; and ſtill plainer in exfoliations, the coming away of the ſplinters of bones afterwards, &c. The number of theſe laminæ anſwers to the thickneſs of the bone.

The external may be obſerved to lie in pretty regular ſtrata; but in the more internal, this diſpoſition is gradually altered, theſe appearing in ſome meaſure to lie in gathers or unequal folds. The innermoſt of all are perforated by many holes of different ſize and figure.

In like manner do the laminæ which compoſe the ſolid parts of bones change their regular diſpoſition, to form what I call the cellulous or ſpongy part, which makes up almoſt the whole interior texture of the bones, which have not large cavities, and of all the epiphyſes without exception; but in the hollow bones this part is found only near the extremities.

The cells or void ſpaces in this ſpongy part are more conſiderable in ſome bones than in others; and the plates which compoſe them differ in form as well as in extent; being more or leſs flat, crooked, twiſted, angular, irregular, thick, thin, broad, narrow, &c.

In many bones theſe plates appear to degenerate into ſmall filaments, ſo that the cellulous part of ſuch bones is, as it were, a mixture of plates and filaments, repreſenting a kind of fine ſponge. In ſome bones, a certain regularity may be obſerved in the diſpoſition of them.

Beſides the ſmall filaments found in the cellulous part of bones, there is a reticular texture of them in the cavities of ſeveral long bones; the bony threads of which net-work are long, fine, branched, and pliable, and curiouſly interwoven at different diſtances.

This reticular texture may be ſaid to ariſe partly from the ſides of the innermoſt laminæ of thoſe bones, partly from their extremities, and partly from the cellulous portion. Several ramifications are produced from it, which appear, as it were, ſuſpended in the air, through the whole length of the cavity of the bone, meeting and uniting together from all quarters, in many places, which however are always at a conſiderable diſtance from each other. This texture is very often deſtroyed in raking out the marrow, when bones are deſigned for a ſkeleton.

Internal Cavities of Bones.—Beſides the cavities which appear in examining the external conformation of bones, there are others obſervable in examining their internal ſtructure; which may all be reduced to three kinds, very different from one another.

The firſt kind comprehends the large internal cavities found chiefly in the middle of the long bones, which are nearly of a cylindrical figure, ſuch as the os humeri, ulna, radius, os femoris, tibia, fibula, the bones of the metacarpus, metatarſus, fingers and toes. In theſe the cavities are proportionable to the length and thickneſs of the bones.

The ſurface of theſe cavities is more ſmooth and even in the middle than near the extremities, where they become more rough, unequal, and furrowed, according as the diſpoſition of the laminæ happens to be changed; and bony productions or croſs pieces may ſometimes be obſerved in them, which are either ſingle or combined together in different manners. The reticular texture already deſcribed, is chiefly found in theſe large cavities.

The ſecond kind of internal cavities conſiſts of the cells and intervals in the cellulous portion of bones.

Of theſe ſome are large, ſmall, ſingle, double, or more compounded, and of theſe laſt ſome contain ſeveral ſmall ones within them. Others are round, flat, oblong, tubular, oval, angular, ſquare, irregular, &c. and of theſe the oblong and tubular lie in directions nearly parallel to the length of the bone. Almoſt all theſe cells communicate with one another in different manners.

The third ſort of internal cavities comprehends the ducts and pores found in the ſubſtance of bones. *Winſlow's Anatomy.*

BONIS Non Amovendis, in law, is a writ directed to the ſheriffs of London, &c. charging them, that a perſon againſt whom judgment is obtained, and proſecuting a writ of error, be not ſuffered to remove his goods until the error is determined.

BONITO, a very beautiful fiſh, of the tunny kind, and called by ſome curvata pinima. It is a large ſea fiſh, with a long, broad, and thick body: its eyes are large, as alſo its gills; and the greater part of its body is free from ſcales.

BONNET, in naval affairs, an additional part to be laced to the bottom of a ſail in light winds, and taken off again in ſtormy weather. They are only uſed in ſmall veſſels.

Bonnet, in fortification, a ſmall work, conſiſting of two faces, having only a parapet with two rows of paliſadoes, of about ten or twelve feet diſtance: it is generally raiſed before the ſaliant angle of the counterſcarp, and has a communication with the covered-way, by a trench cut through the glacis, and paliſadoes on each ſide.

Bonnet A'Pretre, or *Prieſt's* Bonnet, in fortification, is an out-work, having at the head three ſaliant angles, and two inwards. It differs from the double tenaille only in this, that its ſides, inſtead of being parallel, are like the queue d'aronde, or ſwallow's tail; that is, narrowing or drawing cloſe at the gorge, and opening at the head.

BONNY, in minerology, a name given by our miners to a bed of ore found in many places in hills, not forming a vein, nor communicating with any other vein, nor terminating in ſtrings, as the true veins do. It is a bed of ore of five or ſix fathom deep, and two, or ſomewhat leſs than that, in thickneſs, in the largeſt ſort; but there are ſmaller, to thoſe of a foot long. They have their trains of ſhoad-ſtones from them, and often deceive the miners, with the expectation of a rich lead vein. They differ from the ſquats only in being round beds of ore, whereas the ſquats are flat. See Squat.

BONZES, Indian prieſts, who, in order to diſtinguiſh themſelves from the laity, wear a chaplet round their necks, conſiſting of an hundred beads, and carry a ſtaff, at the end of which is a wooden bird; they live upon the alms of the people, and yet are very charitably diſpoſed, maintaining ſeveral orphans and widows out of their own collections. The Tonguineſe have a pagod, or temple, in each town, and every pagod has at leaſt two bonzes belonging to it; ſome have thirty or forty. The bonzes of China are the prieſts of the Fohiſts, or ſects of Fohi; and it is one of their eſtabliſhed tenets, that there are rewards allotted for the righteous, and puniſhments for the wicked, in the other world; and that there are various manſions, in which the ſouls of men will reſide, according to their different degrees of merit. The bonzes of Pegu are, generally, gentlemen of the higheſt extraction.

BOOBY, a bird of prey, nearly allied to the gooſe-kind, common about Jamaica.

BOOK, *Liber*, the compoſition of a man of wit or learning, deſigned to communicate ſomewhat he has invented, experienced, or collected, to the public, and thence to poſterity; being withal of a competent length to make a volume.

In this ſenſe, a book is diſtinguiſhed from a pamphlet, by its greater length; and from a tome, or volume, by its containing the whole writing. According to the ancients, a book differed from an epiſtle, not only in bulk, but in that the latter was folded, and the former rolled up; not but that there are divers ancient books now extant, under the names of epiſtles.

Origin of BOOKS.—We have nothing that is clear on that ſubject. The books of Moſes are doubtleſs the oldeſt books now extant; but there were books before thoſe of Moſes, ſince he cites ſeveral. Scipio Sgambati, and others, even talk of books before the Deluge, written by the patriarchs Adam, Seth, Enos, Cainan, Enoch, Methuſelah, Lamech, Noah and his wife; alſo by Ham, Japhet and his wife; beſides others, by dæmons or angels; of all which ſome moderns have found enough to fill an Antediluvian library: but they appear all either the dreams of idle writers, or the impoſtures of fraudulent ones. A book of Enoch is even cited in the Epiſtle of Jude, ver. 10. and 15. from which ſome endeavour to prove the reality of the Antediluvian writings; but the book cited by that apoſtle is generally allowed, both by ancient and modern writers, to be ſpurious.

Of profane books, the oldeſt extant are Homer's poems, which were ſo even in the time of Sixtus Empiricus; though we find mention in Greek writers of ſeveral others, prior to Homer, as Hermes, Orpheus, Daphne, Horus, Linus, Muſæus, Palamedes, Zoroaſter, &c. but of the greater part of theſe there is not the leaſt fragment remaining; and of others, the pieces which go under their names are generally held, by the learned, to be ſuppoſititious. F. Hardouin goes farther, charging all the ancient books, both Greek and Latin, except Cicero, Pliny, Virgil's Georgics, Horace's Satires and Epiſtles, Herodotus, and Homer, to be ſpurious, and forged in the XIIIth century, by a club of perſons, under the direction of one Severus Archontius. Among the Greeks, it is to be obſerved, the oldeſt books were in verſe, which was prior to proſe. Herodotus's hiſtory is the oldeſt book extant of the proſaic kind.

Materials of BOOKS.—Several ſorts of materials were uſed formerly in making books: plates of lead and copper, the bark of trees, bricks, ſtone, and wood, were the firſt materials employed to engrave ſuch things upon, as men were willing to have tranſmitted to poſterity. Joſephus ſpeaks of two columns, the one of ſtone, the other of brick, on which the children of Seth wrote their inventions and aſtronomical diſcoveries. Porphyry makes mention of ſome pillars, preſerved in Crete, on which the ceremonies, practiſed by the Corybantes in their ſacrifices, were recorded. Heſiod's works were originally written upon tables of lead, and depoſited in the temple of the Muſes, in Bæotia. The ten commandments, delivered to Moſes, were written upon ſtone; and Solon's laws, upon wooden planks. Tables of wood, box, and ivory, were common among the ancients: when of wood, they were frequently covered with wax, that people might write on them with more eaſe, or blot out what they had written. The leaves of the palm-tree were afterwards uſed inſtead of wooden planks, and the fineſt and thinneſt part of the bark of ſuch trees, as the lime, the aſh, the maple, and the elm; from hence comes the word *liber*, which ſignifies the inner bark of the trees; and as theſe barks were rolled up, in order to be removed with greater eaſe, theſe rolls were called *volumen*, a volume; a name afterwards given to the like rolls of paper, or parchment.

Thus we find books were firſt written on ſtones, witneſs the Decalogue given to Moſes: then on the parts of plants, as leaves chiefly of the palm-tree; the rind and barks, eſpecially of the tilia, or phillyrea, and the Egyptian papyrus. By degrees wax, then leather, were introduced, eſpecially the ſkins of goats and ſheep, of which at length parchment was prepared: then lead came into uſe; alſo linen, ſilk, horn, and laſtly, paper itſelf.

Form of BOOKS.—The firſt books were in the form of blocks and tables: but as flexible matter came to be wrote on, they found it more convenient to make their books in the form of rolls: theſe were compoſed of ſeveral ſheets, faſtened to each other, and rolled upon a ſtick, or umbilicus; the whole making a kind of column, or cylinder; which was to be managed by the umbilicus as a handle, it being reputed a crime to take hold of the roll itſelf: the outſide of the volume was called *frons*; the ends of the umbilicus, *cornua*, horns, which were uſually carved, and adorned with ſilver, ivory, or even gold and precious ſtones: the title, συλλαβος, was ſtruck on the outſide; the whole volume, when extended, might make a yard and a half wide, and fifty long. The form which obtains among us is the ſquare, compoſed of ſeparate leaves; which was alſo known, though little uſed, by the ancients.

To the form of books belongs alſo the internal œconomy, as the order and arrangement of points and letters into lines and pages, with margins and other appurtenants. This has undergone many varieties; at firſt the letters were only divided into lines, then into ſeparate words, which, by degrees, were noted with accents, and diſtributed, by points and ſtops, into periods, paragraphs, chapters, and other diviſions. In ſome countries, as among the Orientals, the lines began from the right, and ran towards the left; in others, as the northern and weſtern nations, from left to right; others, as the Greeks, followed both directions, alternately going in the one, and returning in the other, called *bouſtrophedon*: in moſt countries the lines run from one ſide to the other: in ſome, particularly the Chineſe, from top to bottom. Again, in ſome the page is entire and uniform; in others, divided into columns; in others, diſtinguiſhed into texts and notes, either marginal, or at the bottom; uſually it is furniſhed with ſignatures, and catch-words; ſometimes alſo with a regiſter, to diſcover whether the book is complete. To theſe are added the apparatus of ſummaries, or ſide-notes, the embelliſhments of red, gold, or initial letters, head-pieces, tail-pieces, effigies, ſchemes, maps, and the like. The end of the book, now denoted by FINIS, was anciently marked with this character <, called cornis: there alſo occur certain formulas at the beginnings and endings of books; the one to exhort the reader to be courageous, and proceed to the following books; the others were concluſions, often guarded with imprecations againſt ſuch as ſhould falſify them.

BOOK-BINDING is the art of gathering and faſtening together the ſheets of a book, and covering it with a back.

The ancient art of binding of books, when firſt the ſeveral ſheets of writings of authors were collected together, was not attended with great difficulties; for the leaves were only glued together, and rolled on round pieces or cylinders of wood; which manner of book-binding, whoſe invention is attributed to the Egyptians, was continued till long after the age of Auguſtus, and is ſtill retained by the Jewiſh ſynagogues, where they continue to write the books of the law on vellums ſewed together, making, as it were, only one long page, with two rollers, having claſps of gold or ſilver at their extremities, the whole book being wrapped up in a piece of ſilk, which ſerves as a cover to it.

But, as this manner of binding books is attended with many inconveniencies, one of the Attali, kings of Pergamus, invented the form now in uſe, of ſquare binding, or of ſewing ſeveral quires one over another, as more commodious to the reader, who can open and ſhut his book in an inſtant, without the leaſt difficulty, and without the leaves being expoſed to wear out ſo ſoon as when rolled up, eſpecially of books written or printed on paper. It is performed in the following manner:

The leaves are firſt folded with a thin piece of ivory called a folding-ſtick, and laid over each other in the order of the ſignatures; then beaten on a ſtone with a hammer to make them ſmooth and open well, and afterwards preſſed. They are then ſewed upon bands, which are pieces of cord or packthread, ſix bands to a folio book, five to a quarto, &c. which is done by drawing a thread through the middle of each ſheet, and giving it a turn round each band, beginning with the firſt, and proceeding to the laſt.

The French book-binders apply a ſheet of parchment the length of the book, on the inſide of each paſte-board, ſo, however, as that, being cut or indented in the places againſt the bands, it comes out between the edge of the paſte-board and the leaves of the book, to cover the back; they call this indorſing, and they are obliged to do it, on the penalty of thirty livres, and the re-binding of the book. It is done in the preſs, where the back being grated with an iron inſtrument, with teeth to make the paſte-board hold, wherewith the parchment is firſt faſtened, they afterwards add ſtrong glue to fortify it. After this the books are glued, and the bands opened and ſcraped for the better fixing the paſte-boards; the back is turned with a hammer, and the book fixed in a preſs between two boards, called backing-boards, in order for making a groove for fixing the paſte-boards; which being applied, holes are made for fixing them to the book, which is preſſed a third time: then the book is put at laſt to the cutting-preſs, betwixt two boards, the one lying even with the preſs, for the knife to run upon; the other above it, for the knife to cut againſt; after which the paſte-boards are ſquared with a pair of ſhears.

The next operation is ſprinkling the leaves of the book, which is done by dipping a bruſh made of hogs briſtles into vermilion and ſap-green, holding the bruſh in one hand, and ſpreading the hair with the other; by which motion the edges of the leaves are ſprinkled in a regular manner, without any ſpots being bigger than the others, at leaſt ſo far as to be diſagreeable to the eye.

Then remain the covers, which are either of calf-ſkin, or ſheep-ſkin. Anciently books were always bound in parchment, and moſt of our valuable books, even ſince the invention of printing, have no other binding; but this practice has been long diſuſed. The beſt binding at preſent is in calf.

The calf or ſheep-ſkin, being moiſtened in water, is cut out to the ſize of the book with a knife, then ſmeared over with paſte, made of wheat flour, and afterwards ſtretched over the paſte-board on the outſide; and doubled over the edges within-ſide, after having firſt taken off the four angles, and indented and plated it at the head band; which done, the book is corded or bound firmly between two bands, with a kind of whipcord, to make the cover ſtick the ſtronger to the paſte-board and the back, as alſo to form the bands or nerves more accurately; then ſet to dry, and, when dry, uncorded, and the leaves at each end opened. Afterwards, the book is waſhed over with a little paſte and water, and then ſprinkled fine with a bruſh, by ſtriking it either againſt the hand, or a ſtick, unleſs it ſhould be marbled; for then the ſpots are to be made larger, by mixing the ink with vitriol. Then the cover is glazed twice, with the white of an egg beaten, as painters do their pictures, when they are finiſhed, and at laſt poliſhed with a poliſhing iron paſſed hot over the glazed cover.

Thus the binding of a book, properly ſo called, is finiſhed, unleſs it ſhould be lettered; for then a piece of red Morocco is paſted on the back, between the firſt and ſecond bands, to receive the title in gold letters, and ſometimes a ſecond betwixt the next bands underneath, to receive the number of the volume. In France, they ſeldom bind any book without both, if the work conſiſts of ſeveral volumes; which done, the book-binder ſends his books to the gilder, which in that kingdom is a profeſſion apart, or ſeparate from book-binding.

The gilder makes the letters on the back, and the roſes, ſtars, &c. between the bands, with punchions engraven in relievo, which they preſs flat down, and the lines, embroideries, &c. with little cylinders of braſs, rolled along by an iron roller, by means of a double branch; in the middle whereof they are fitted on an iron ſtay, or axis, that paſſes the middle of their diameter. Before they apply any of theſe tools, they glaze thoſe parts of the leather whereon they are to be applied, lightly over with a pencil, or ſponge; and when half dry, lay over them pieces of leaf gold, cut out near the ſize; and on theſe ſtamp the punchions, which are beat down with a mallet or hammer, if the figures be large, and require a great relievo, as arms, &c. or roll the cylinders, both the one and the other, reaſonably hot. The gilding thus finiſhed, they rub off the ſuperfluous gold with a hare's foot, leaving nothing covered with gold, but the places whereon the hot tools have left their impreſſions.

Book-Keeping, commonly called merchants accounts, implies the method of recording the dealings and tranſactions of buſineſs in ſuch an exact and accurate manner, that the books of a merchant, factor, agent, &c. may at all times ſhew the juſt and true ſtate of all and every diſtinct part of his trading concerns.

In keeping mercantile accounts, by the method of double entry, three principal books are abſolutely neceſſary; the Waſte-Book, the Journal, and the Ledger. Beſides theſe, ſeveral other ſubſervient or auxiliary books are generally uſed in the counting-houſe; but theſe are more or leſs in number, according to the nature of the trade, the quantity of buſineſs, or manner of keeping the accounts; and he is always reckoned the beſt accountant who makes uſe of the feweſt ſubſidiary books.

The Waſte-Book is an univerſal and complete memorial of all the tranſactions and events of buſineſs, recorded promiſcuouſly in the regular order of time as they happened, and according to their proper debtors and creditors. This, being the firſt and moſt eſſential book, cannot be kept with too much accuracy and regularity, becauſe it is always regarded as the principal voucher in all diſputes relating to trade.

This book opens with an inventory of a merchant's ready money and effects, the debts due to him and what he owes to others; then follows a minute and accurate record of every tranſaction of his commerce, with all the neceſſary circumſtances of date, ſums, conditions, quantity, quality, price, and every other particular that may help to render the entries ſatisfactory and intelligible both to the preſent and all ſucceeding book-keepers.

The Waſte-Book, commonly given in books of merchants accounts, is very different from the form of that book in real buſineſs, being only a plain narrative of the tranſactions of each particular day by way of memorandum, from whence the learner is to make out the Journal and Ledger entries.

The Journal, by way of preparatory to the Ledger, contains an abbreviation of the Waſte-Book entries, in the ſame form and order of time; with only this difference, that the groſs, tare, and nett, of each particular caſk, bag, box, or other package, are expreſſed in full in the Waſte-Book; whereas the nett, weight, and price, are ſufficient to be mentioned in a Journal-poſt.

The Ledger is the grand and principal book of accounts, wherein the ſeveral articles belonging to the ſame ſubject, are collected together, and ranged in their natural order of D^{r}. and C^{r}. on the oppoſite ſides of their reſpective accounts. When this book is duly poſted, the various tranſactions and dealings of a merchant, with reſpect to men, money, and merchandiſe, are ſo regulated and diſpoſed under their proper heads, that they afford a comprehenſive view of all his negotiations: from which a complete ballance of his traffic being made, he may at any time ſee the true ſtate of each branch of his buſineſs, and know the amount of his preſent ſtock, or what he is worth at that time.

The uſe of the three principal books being deſcribed, we ſhall next proceed to the explanation and uſe of the terms Debtor and Creditor.

As all tranſactions in trade are mutual between perſon and perſon, the records of commerce muſt conſiſt of two oppoſite parts, in order to be duly charged or debited on one ſide, and diſcharged or credited on the other, as the nature and reaſon of the events may require.—And as in all our dealings together, one man becomes indebted, or D^{r}. to another, for the value owing, and the other gives him credit, or is his C^{r}. for the ſame ſum due: ſo in trade, if all accounts of money, merchandiſe, and deſigns, be looked upon as accountable for their reſpective values, they muſt alſo be charged as indebted, or D^{rs}. for the ſeveral ſums expended upon them, and be diſcharged or credited for whatever they repay or produce in return by ſale, &c.

Whence it is evident, as all accounts conſiſt of two oppoſite parts, the D^{r}. ſide on the left hand page of the Ledger, and the C^{r}. on the right, the terms D^{r}. and C^{r}. always expreſs the relation between the two parts of each tranſaction, and ſhew to which ſide of their reſpective accounts in the Ledger they are to be carried.

The nature and uſe of the terms D^{r}. and C^{r}. being premiſed, it naturally follows to point out what is contained on the D^{r}. and C^{r}. ſides of each account.

All the tranſactions of trade may be reduced to theſe three branches. Firſt, Proper Trade, as it is carried on by the merchant himſelf at home, with the aſſiſtance of his factors abroad. Secondly, Factorage, or the buſineſs which he manages for another on commiſſion. Thirdly, Partnerſhip, or Company Accounts, which are carried on either by one of the partners, or an indifferent perſon, as agent or truſtee, in the name and for the joint account of all the partners concerned.

Let the buſineſs of a merchant be ever ſo extenſive, all the diſtinct ſpecies of accounts that can poſſibly happen, are reducible to theſe four; Caſh, Merchandiſe, perſonal Accounts, and Deſigns.

The Caſh Account contains, on the D^{r}. ſide, the ready money which the merchant had in hand when the account was opened, and all he has received ſince. The C^{r}. ſhews what has been given out in payments. And the difference between the ſides always falls on the D^{r}. ſide, agreeable to the count of caſh in hand: the C^{r}. ſide never can be the heavieſt, becauſe no one can pay away more than he had.

The accounts of goods, containing the prime coſt and charges, make the D^{r}. ſide; the quantity and value ſold or diſpoſed of, go to the C^{r}. ſide: the difference between the ſides ſhews the quantity of goods on hand, and the gain or loſs by what was delivered out.

In ſelling goods on commiſſion, for another, the C^{r}. ſide of the account of ſales is the ſame with other accounts of your own goods; but the D^{r}. ſide contains only the freight, commiſſion, and other charges, without any mention of prime coſt or value; becauſe they are not your own property, and the difference between the C^{r}. ſide, or groſs ſales, and the charges and commiſſion on the ſales, is the nett proceeds of the ſales, and ſhews what is due from you to your employer, when you have received all the value ariſing from the ſale of his goods.

In all accounts of merchandiſe, the different kinds, quantities, and prices, ſhould always be diſtinguiſhed by inner columns in the Ledger, from which a merchant may at any time ſee the quantity, weight, &c. of what goods he has on hand, and know the ſtrength of his warehouſe, without the trouble of examining the contents.

The prime coſt or valuation, with all incidental charges of repairs, inſurance, or other expences laid out upon them, go to the D^{r}. ſides of the accounts of ſhips, houſes, or other poſſeſſions; the C^{r}. ſide contains the freight, rent, or other profits ariſing from them, while in poſſeſſion, and the amount of ſales when they are diſpoſed of; from which the true ſtate of all ſuch accounts may be eaſily known, as in accounts of goods.

The Perſonal Accounts contain on the D^{r}. ſide the debts due to you from the perſon whoſe name ſtands in the title of the account, whether for goods ſold, caſh lent, or received on your account, and the payments of your debts to him: the C^{r}. ſide is filled up with the debts you owe him, the payments of his debts to you, and the remittances he has made to you: when the difference falls on the D^{r}. ſide, it ſhews what is due by you to him, and when the D^{r}. ſide is heavieſt, the debt is due from him, or your money remaining in his hands.

Under this head are included all accounts current, and accounts of bills: and as theſe accounts are diſtinguiſhable only by ſome ſmall alteration in the words of their titles, it may not be improper to explain the difference between them.

Bills Receivable, are thoſe drafts which come into the hands of a merchant in the courſe of trade, and which he may either paſs off in making his payments, or keep them in his hand till they become due, and then receive the value from the perſon upon whom they were drawn: the D^{r}. ſide ſhews what bills you have received, and the C^{r}. how you have diſpoſed of them; the difference is the value ſtill in hand.

Bills Payable are thoſe drafts which are drawn upon a merchant, and never come into his hands, but for acceptance, or after he has paid the value in caſh, or ſome other way ſatisfied the preſent poſſeſſor: the bills drawn upon you are to be placed to the C^{r}. ſide of this account, and the D^{r}. ſide ſhews how many you have diſcharged.

When you tranſact buſineſs for any one of your correſpondents, the particulars relating to ſuch accounts are to be entered in your Ledger, under the title of A. B. *His Account Current:* the ſame account in your correſpondents Ledger is titled I. C. my account current, and in the foregoing caſe I. C. his account current.

In all your dealings with foreign correſpondents, it is abſolutely neceſſary, that you keep the accounts in the money of both countries, the foreign money in the inner columns of the Ledger againſt its ſterling value, in the money columns at the courſe of exchange then going. By this method you may always know the ſtate of your accounts, with your foreign correſpondents, in the coin of both countries. When the foreign money is equal, the difference between the ſterling columns is your gain or loſs, by the exchange; if the ſterling money be equal, the difference between the inner columns is due to or from you, at the current rate of exchange: for as your correſpondent pays, and receives only the ſpecies of his own country, when the account balances with him you are not to expect any further remittance.

Deſigns, or fictitious accounts, comprehend all voyages and adventures, which contain on their D^{r}. ſide the prime coſt, charges, inſurance, &c. of the cargo ſhipped. The D^{r}. ſide is filled with the diſpoſal of the goods, returns received from the factor, the ſum received or due from the inſurers for a total loſs, or in caſe of a partial loſs, with the value to be made good by the inſurers, and the value ſaved; the difference between the ſides is the gain or loſs made by the voyage or adventure, &c.

All intermediate accounts of pure diſburſements for which nothing comes in, or nett incomes for which no value goes out, ſuch as charges of merchandiſe, houſe expences, intereſt and diſcount, inſurance, gratuities, commiſſion, or any other accounts of gain or loſs, contain on the D^{r}. ſide the reſpective loſſes, and on the C^{r}. ſide the particulars gained.

To open the BOOKS.—The Waſte-Book and Journal are both ruled alike, with three columns for pounds, ſhillings, and pence, on the right hand ſide of the page; on the left is a margin for references to the folios of the Ledger, where the particular accounts then mentioned are to be found.

The Ledger is ruled on the left hand ſide of every page, with a margin for the month, one column for the day, and another for the Journal page; and on the right, beſides the reference column to the Ledger folios and money columns, there muſt be inſide columns for the quantity and weight of goods, foreign money, &c. as the nature of the account requires.

Though the dates of the Waſte-Book and Journal entries might ſerve for references to each other; yet as the buſineſs of one day may ſometimes fill ſeveral pages in both, a reference in the Waſte-Book, to the identical page of the Journal poſt, and from thence to the Ledger, will often ſave much time in examining the accounts: and for the more readily turning to any account in the Ledger, which you have occaſion to conſult, the titles of every account, with the number of the folio where they are ſtated, muſt be ſet down in an alphabet under the reſpective initial letters; obſerving to put the names of men under the letters of their ſurname, and adding their other names and place of abode for more particular diſtinction: becauſe you may, perhaps, have dealings with ſeveral of the ſame name, though not of the ſame place.

When the books are thus prepared, the firſt thing to be done, before you enter into trade, is to write an inventory, either on the firſt page of the Waſte-Book, or, as is more common with merchants, on a looſe ſheet of paper, of all the ready money and merchandiſe by you, debts owing to you, voyages, adventures, ſhips, houſes, and all other effects belonging to you: enter theſe ſeveral perſons and parcels, Drs. to your ſtock or general capital, which is uſed inſtead of your own name; and for the debts owing by you, write ſtock Dr. to thoſe ſeveral perſons to whom you are indebted.

Then turning to the Journal, make the ſeveral articles which were particularly expreſſed in the Waſte-Book, Drs. to ſtock, in one line, writing thus:

Sundry Accounts to Stock — — — — — — Drs.

For the amount in money and effects per Waſte-Book - £.

Stock to ſundry Accounts — — — — — — Dr.

For which I am indebted to ſundry perſons. — — £.

And having placed the ſame folio figures on each oppoſite page of the Ledger; becauſe each account conſiſts of two oppoſite parts; write on the top of the left-hand page, in a good round text hand, Stock ——— Dr; and below, placing the month in the margin, the day in the next column, and the Journal folio in the other, write either *To ſundry Accounts*, expreſſing the whole value in one ſum, or *To the ſeveral Particulars*, as in the Waſte-Book, putting the Ledger folios where thoſe accounts are opened, and the reſpective ſums againſt each.

On the right-hand page, write Contra ——— Cr. and in the line below, *By ſundry Accounts*, for the whole value, or *By each Particular*, with its ſum; obſerving the date and folios as on the Dr. ſide.

Then beginning with caſh, enter into the title Caſh ——— Dr. ——— Contra ——— Cr. as you did for ſtock; and beneath, in ſmall hand, on the Dr. ſide, after the date and Journal folio, write, *To Stock for ſo much ready Money*, expreſſing the ſum and Ledger folio, where the account of ſtock is opened.

When all the accounts in the inventory are erected, and charged according to their reſpective debts or credits, the books are then ſaid to be opened, and the merchant may proceed to record the particular tranſactions of real buſineſs.

In poſting from the Waſte-Book to the Journal, and from that to the Ledger, it is common to make a daſh, or ſome other mark at the pleaſure of the book-keeper, in the margin againſt the accounts, to ſhew that they are entered into the other books. This is called *Pricking off the Accounts.*

To poſt or make Entries.—Every entry which is made in the Waſte-Book, ought to conſiſt of all, or as many of the following parts as the circumſtances of the tranſaction will admit.

1. The date in the middle of the page, with lines drawn each way to the columns.

2. The debtor or account to be charged, and creditor or account which is diſcharged, written in a large hand, with Dr. at the end of the ſame line.

3. The reaſon why ſuch a perſon, account or deſign, is made Dr. with the particular conditions of the negotiation.

4. The mark, weight, meaſure, &c. of each particular parcel or package, which is received in or delivered out at the price agreed upon.

5. The total ſum in the money columns.

In thoſe entries where there are ſundry debtors to one creditor, or ſeveral creditors and only one debtor, the ſeveral debtors or creditors are entered in the firſt line after the date, under the title of *Sundries*, or *Sundry Accounts*, and each particular Dr. or Cr. afterwards expreſſed below with their reſpective ſums ſhort-carried.

To an expert book-keeper, a Waſte-Book without a Journal, or a Journal without a Waſte-Book, would be ſufficient; but as he may not always be in the way, or ſometimes in the hurry of buſineſs be obliged to make entries in haſte; this makes it neceſſary to keep a Waſte-Book, from which at leiſure hours the entries may be more correctly and fairly journalized by one hand: for the journal ſhould be written by one perſon, and we will recommend it to all book-keepers to keep the Journal and Ledger always cloſe poſted up with the Waſte-Book.

The Journal entries are no more than a fair copy of the Drs. and Crs. in the Waſte-Book, exactly in the ſame form and words. But the conditions, nett weight, total amount, &c. are expreſſed below in more conciſe and general terms.

As the Waſte-Book entries are transferred into the Journal, ſo are theſe in the Journal poſted into the Ledger, under the reſpective heads; but as all the titles of accounts in the Ledger conſiſt of a Dr. part on the left-hand page, and its counter-part Cr. on the oppoſite page; ſo every entry into this book muſt be placed under two or more different heads, according to the circumſtance of each tranſaction.

For your government in making Waſte-Book and Journal entries, and poſting them into the Ledger, remember the following precepts.

1. In every account there muſt be a debit and a credit part; ſo that whenever you make an entry on the Dr. ſide of any account in the Ledger, you muſt alſo have an equivalent credit of the ſame date under ſome other title. And in thoſe Journal entries, where ſundry accounts are charged Drs. or Crs. the ſeveral debtors and one creditor, or the ſingle debit and ſeveral credits, muſt always be equal; or whatever value you place to the debit of one or ſeveral accounts, juſt ſo much muſt be entered on the Cr. ſide of ſome other account or accounts, before your entry be duly poſted into the Ledger.

2. The receiver is debtor; the deliverer is the creditor. But as the merchant is never to be made a Dr. or Cr. in his own books, whenever he receives or delivers out any thing; then the merchandiſe or money which comes into his hands is the debtor, and whatever he delivers out is the creditor.

The account or deſign, which is by any means increaſed or benefited, or on account of which any thing goes out, either from yourſelf or from any of your correſpondents for your account, is to be charged Dr. for the total amount. That account or deſign which decreaſes, ſuffers loſs, or from whence any thing is produced or comes into your own hands, or into the hands of any one employed for your account, is to be credited or diſcharged from the value.

To correct Errors.—The common method of diſcovering errors, and proving the truth of the poſting, is to make a trial-balance: this is done by adding up all the ſums on the Dr. ſide of the Ledger into one total, and all the ſums on the Cr. ſide into another; when theſe ſums-total agree, the poſting is concluded to be juſt.

But as errors in poſting may be committed many different ways, which will not effect the trial-balance, the only means to be certain that no ſuch neglect or miſtake has been committed, is to prick off all the entries, as well in the Waſte-Book and Journal, as in the Ledger: and as, it is inconſiſtent with the honourable character of a merchant and fair trader, to ſuffer any blotting out or eraſement in his books, when any errors are diſcovered, the book-keeper muſt always acknowledge ſuch miſtakes in plain words in the ſame book where they are found, and place an aſteriſk againſt the erroneous entry and its correction, when he writes them off in the Ledger.

Subſidiary BOOKS. — Beſides the three principal books already deſcribed, thoſe merchants who are largely concerned in trade, find it neceſſary to make uſe of ſeveral other ſubſidiary books, which are chiefly deſigned to eaſe the Caſh-Book, and ſome of the accounts in the Ledger, or to contain the particulars of thoſe kinds of articles, which, though they are neceſſary to be preſerved for the ſake of reference, would take up too much room in the Waſte-Book or Journal.

The following deſcriptions are ranged agreeable to the order of time uſually obſerved in counting-houſes, for admitting young clerks to write in each book.

1. *The Letter* Book.—To keep copies of all the letters of buſineſs which a merchant writes to his correſpondents, may ſometimes prove of the utmoſt importance to his commercial affairs; for as diſputes very often ariſe from orders or advice being ill expreſſed, wrong underſtood, or badly executed, by having recourſe to the letter-book, he may know exactly what was written on any particular occaſion, in what terms and with what limitations an order was given, or what kind of advice had been ſent to any of his correſpondents; he will alſo be enabled to furniſh a true copy of the original which has been loſt or miſlaid.

As no other qualifications but reading and writing are requiſite in copying letters, this is the employment of every young clerk at his firſt admiſſion into the counting-houſe: but, to prevent any omiſſions or alterations, the copy ſhould always be read over, and carefully compared with the original, before it be ſent away.

2. *The Ship's* Book.—Thoſe who have the direction of fitting out ſhips, commonly keep the account for each ſhip in a ſeparate book, which takes its title from the name of the ſhip, as the *Lion's Book*, the *Tyger's Book*, *&c.*

When ſeveral merchants have ſhares of the ſame ſhip, one of the partners being appointed by the reſt to keep the accounts, and have the management of her out-fit, is called the *Ship's Huſband*.

A ſhip's book ſhould contain the invoice of the cargo; the captain's orders; an account of the diſburſements or charges attending the fitting out, and purchaſe, if it be her firſt voyage for that ownery; a liſt of tradeſmen's bills for the cargo, out-fit, and victualling; the names, ſtations, wages, &c. of the ſeveral perſons on board; and the diviſion of the whole among the owners, if more than one, according to their reſpective ſhares. This part is drawn out by the ſhip's huſband, immediately after the ſhip ſails, and ſent to the other parties to be copied. When the ſhip returns from her voyage, the invoice of returns, and if they are not put into the broker's hands to be ſold, their diviſion among the owners, the factor's account of ſales, and account current, are added to it, and copied by the ſeveral parties as before.

3. *The Receipt*-Book.—The moſt common form of this book is quarto, opening the long way, and contains receipts for all the payments a merchant makes, inſtead of having them upon looſe papers, or under the bills of parcels, &c. each receipt being numbered in the margin may ſerve for references, and the ſums may be placed in money columns on the other ſide.

A receipt, being a note of acknowledgement given by the receiver of a ſum of money to diſcharge the payer from his obligation, ſhould have only the date expreſſed in figures; the perſon from whom, and on whoſe account it was received; the ſum received; the reaſon for ſuch payment in full or in part, whether on his own or another's account, ſhould all be ſpecified in words at length, and muſt be ſigned below by the receiver.

4. *The Bill*-Book.—To be regular in buſineſs, and punctual to engagements, is the grand ſupport of all commercial honour and credit: and when a merchant knows what bills he has by him, and when they will become due, what bills he has drawn upon his correſpondents, and what they have drawn upon him, common prudence will dictate ſuch means of maintaining his reputation as are agreeable to the cuſtoms of merchants, and the laws of exchange.

The bill-book is deſigned to ſupply this part of neceſſary information, and in ſome counting-houſes contains exact copies of all the bills which are drawn by or paſs through the hands of the merchant, with the indorſers written in the margin on one ſide, and the perſon's name to whom they are paſſed on the other.

5. *The Invoice*-Book.—This book contains copies of all the invoices of goods which a merchant ſhips off to ſea, or receives from abroad, either on his own private account, in partnerſhip, or for others in commiſſion. And to render the invoices eaſier to be found, the invoice-book ſhould be paged, and have an alphabet at one end.

The title of every invoice ſhould declare the name of the ſhip wherein the goods are ſhipped, the maſter's name, the merchant to whom and on whoſe account they were ſhipped, with their reſpective places of reſidence.

Then ſhould follow a minute detail of all the different kinds, quantities, and qualities, of the merchandiſe ſhipped, with all the particular circumſtances relating to their mark, number, package, price, &c.

Below this muſt be annexed an account of the freight, cuſtom, charges, brokerage, commiſſion, &c. attending the purchaſe or ſhipping, which being ſhort-carried muſt be brought into the money columns in one ſum, and being added to the value of the merchandiſe above, gives the amount of the invoice in the money of that country where the goods were ſhipped.

And, to complete the whole in the common mercantile form of cloſing all invoices, accounts, current accounts of ſales, &c. at the foot of the invoice write, *Errors excepted*, to ſignify that if any errors or omiſſions have paſſed unobſerved, they are no more than overſights, and not intended to the prejudice of either party. Immediately after this muſt be written the place and date of drawing the account; and in the next line below it muſt be ſigned by the perſon who ſhipped the goods.

6. *The Sales*-Book.—This book contains a collection of the ſeveral ſales of merchandiſe which have been made either by you for your employers, or on your account by your correſpondents at other markets.

An account of ſales is the account given by one merchant to another, or by a factor to his principal, of the diſpoſal, charges, commiſſion, and nett proceeds of certain merchandiſe ſent for the proper or company accounts of him who conſigned the ſame to ſuch factor or vender, and is always made out in the current money of that country wherein the buſineſs is tranſacted.

There are ſeveral methods of drawing up accounts of ſales; the firſt is to collect all the goods of the ſame kind, and place them together in the ſame order as they were ſold, with their prices and values ſhort-carried; then add up the quantities to be compared with the invoice, and carry the amount into the money columns: when you have gone through all the particulars, place the charges below, which being deducted from the amount of the ſale, leaves the nett proceeds.

7. *The* Book *of Accounts Current*.—This book is kept in the Ledger form of D^{r}. and C^{r}. and contains copies of all the accounts current, which are drawn up to be ſent to correſpondents, in order to have them ſettled in concert before they are cloſed in the Ledger.

If thoſe merchants who tranſact buſineſs by commiſſion for others, would always take care to tender an account current to be examined and paſſed by their employer as ſoon as his affairs are finiſhed, it would certainly be the moſt effectual means of preventing thoſe differences and diſputes in trade, which ſo often ariſe from accounts ſtanding open too long, and might have been eaſily adjuſted while the particular circumſtances were freſh in the memories of both parties.

8. *The Warehouſe*-Book.—The uſe of this book is to keep memorandums of the marks, numbers, package, quantity, quality, &c. of all the merchandiſes which are from time to time received into or delivered out of a merchant's warehouſe; together with the names of thoſe from whom they are received, and to whom they are delivered, and all other particular conditions neceſſary to be mentioned in the Waſte-Book entry.

Some merchants keep their warehouſe-book on the two oppoſite pages in the Ledger form: the left-hand page containing the marks, numbers, weights, &c. of the goods taken into the warehouſe; and on the right-hand page they follow the ſame method for thoſe which are ſent out: but if the quantities of goods be kept in the inner columns of the Ledger, the ſtock of merchandiſe on hand may be much eaſier known, and this method of keeping the warehouſe-book will be entirely ſuperſeded.

9. *The* Book *of Expences.* — The particulars of all the different charges and expences on trade, ſuch as carriage, duties, freight, wharſage, porterage, houſe expences, poſtage of letters, rents, &c. may either be kept on different pages of the ſame book, or in as many ſeparate books as the merchant finds convenient for his buſineſs.

The firſt commiſſion conferred on a young clerk in the counting-houſe is keeping the petty caſh: in this office he is appointed to pay and keep the account of all incident petty expences and commerce.

It may not be improper for thoſe who tranſact buſineſs on commiſſion for others, to keep ſeparate accounts of the expences attending each employer's affairs, from which they may at any time eaſily furniſh a copy of the particulars when requeſted, or carry the amount to their reſpective accounts when they are ſent in.

The model of this book is very eaſily conceived; and all that is neceſſary to be obſerved in keeping it is, that the caſh paid out in expences on the houſhold or commercial affairs, muſt be carefully entered under the reſpective title of the account for which it was paid, and then once a week or month be caſt up, and the ſum total transferred to the Waſte-Book.

10. *The Caſh* Book.—The caſh-book, or caſh-ledger, is the moſt important of all the ſubſidiary books. It is kept in the Ledger form, and contains on the D^r. ſide all the particular ſums of money which are daily received, and the ſeveral ſums delivered out in payments, are entered on the C^r. ſide, with references from each entry to the correſponding accounts in the Ledger.

From keeping the petty caſh, the young clerk is promoted to the care of the general caſh, and then he is ſtiled the caſhier, or caſh-keeper: and as the caſh-keeper is liable to make good all deficiencies in the caſh, it is his buſineſs only to keep the caſh-book; which for his own ſatisfaction ſhould often be examined how it agrees with the caſh in hand, and once a week, or month, as it is found moſt convenient, muſt be transferred to the Ledger.

Book-Seller, one who trades in books, whether he prints them himſelf, or gives them to be printed by others.

BOOM, in marine fortification, a ſtrong chain, on which are faſtened a number of yards, poles, &c. extended acroſs the mouth of a harbour to prevent the entrance of enemies ſhips.

Booms, in naval affairs, long poles to extend the bottom of certain ſails; of theſe there are ſeveral kinds, as ſtudding-ſail-booms, jib-boom, ſquare-ſail-boom, and main-boom; the two laſt however are only uſed in ſmall veſſels. This is likewiſe a general name for all maſts and yards.

BOOPHTHALMUS, a kind of agate with large circles in it, bearing ſome reſemblance to an ox's eye, from whence it has got this name.

BOOT, a well-known cover for the leg, made of leather.

Boot-Tree, or Boot-Last, an inſtrument uſed by ſhoe-makers to widen the leg of a boot. It is a wooden cylinder ſlit into two parts, between which, when it is put into the boot, they drive by main force a wedge or quoin.

Boot-topping, in naval affairs, when a ſhip, either from the hurry of her voyage, or the want of a convenient ſituation, cannot get her bottom cleaned of the filth that gathers to it at ſea; it is uſual to make her heel, or incline firſt to one ſide and then to the other, as much as they may do it without danger of over-turning her; and having ſcrubbed off the ooze, ſhells, or other excrement, with bruſhes and brooms, they cover it with a mixture of tallow, ſulphur, &c. and this is called giving her boot-tops. See Careen, Dock, Hog.

BOOTES, a conſtellation of the northern hemiſphere, conſiſting of twenty-three ſtars, according to Ptolemy's catalogue; of twenty-eight in Tycho's; of thirty-four in Bayer's; of fifty-two in Hevelius's; and of fifty-five in Mr. Flamſtead's catalogue.

BOOTY, whatever is taken from an enemy in time of war. By the law of Moſes, the booty taken from the enemy was to be divided equally between thoſe who were in the battle, and the reſt of the people. And Moſes adds, "Ye ſhall likewiſe ſeparate the Lord's ſhare, which ye "ſhall take out of the whole booty belonging to the "men of war."

The rabbins pretend, that under the kings of Iſrael, another rule was followed in the diſtribution of the ſpoil. Every thing was given to the king which belonged to the conquered king, his tent, ſlaves, cattle, &c. After this the reſt of the booty was divided into two equal parts, of which the king had one moiety, and the other was diſtributed among the ſoldiers who were in the action, and thoſe who continued in the camp.

Among the Greeks, the booty was divided equally, a ſhare being reſerved for their gods. By the military diſcipline of the Romans, the booty belonged to the Republic, and the generals ordered it all to be carried to the public treaſury. Sometimes, indeed, it was diſtributed among the ſoldiers, as a reward of their bravery, and in order to animate them in future actions.

BOQUINIANS, in church hiſtory, a ſect of heretics, ſo called from Boquinus their founder, who taught that Chriſt did not die for all mankind, but only for the faithful, and conſequently was only a particular Saviour.

BORAGO, Borage, a very hairy rough plant, with wrinkled blackiſh green leaves approaching to an oval ſhape, and round hollow ſtalks on which the leaves are ſet alternately: on the tops of the branches come forth blue, ſometimes reddiſh or whitiſh, monopetalous flowers, each of which is divided into five ſharp-pointed ſegments, and followed by four wrinkled blackiſh ſeeds, lying naked in the enlarged cup. It is annual, and grows wild on waſte grounds, and on old walls.

The leaves of this plant are very juicy, of no ſmell, and of hardly any particular taſte: they ſeem nevertheleſs to contain ſubſtances of ſome medicinal activity, though in too ſmall proportion to be ſenſible, till ſeparated from the herbaceous matter. Mr. Boulduc relates, that a decoction of borage leaves, evaporated to the conſiſtence of a ſyrup, and ſet by for a few days, yielded ſaline cryſtals, partly in form of fine needles, and partly cubical: that the needled cryſtals were found to be perfect nitre, and the cubical ſea ſalt: that by paſſing the decoction through quick lime before the inſpiſſation, both ſalts were obtained in greater purity, and in larger quantity: that the ſubſtance of the leaves, remaining after the boiling, being dried and burnt, and the aſhes elixated with water, the ley, properly evaporated and ſet to ſhoot, yielded firſt a vitriolated tartar, and afterwards ſea ſalt, the liquor, after the cryſtallization, proving ſimply alkaline. From this analyſis it may be preſumed, that the aperient and refrigerating virtues aſcribed to borage leaves are not wholly without foundation; though theſe virtues are undoubtedly very weak. Malouin remarks, that the juice of the leaves, (which is not green, like that of moſt other herbs, but of a brown colour) added to bitter mixtures of the juices of creſſes and chervil, diſſipates their bitterneſs.

The flowers of the plant have been principally made uſe of, and are generally ranked among the cordials. Medicines may act as cordials, either by virtue of ſome warmth, pungency, or fragrance; or by a ſaline quality, abating immoderate heat: but borage flowers ſeem to have little power of operating in either of theſe intentions. When freſh, they have a very ſlight ſmell, of the agreeable kind, which in drying is loſt: to the taſte, both the flowers in ſubſtance, and an extract made from them by water, are only mucilaginous and ſweetiſh. *Lewis's Hiſtory of the Materia Medica.*

BORAK, a fabulous animal, ſaid to be of a middle nature, between an aſs and a mule, and to have carried Mahomet in his aerial journies from Jeruſalem into Heaven.

BORAX, a ſaline ſubſtance, of which neither the origin, or the component parts are as yet known. It comes from the Eaſt-Indies in little cryſtalline maſſes, ſomewhat reſembling ſmall cryſtals of ſal gem, mixed with earth and other impurities.

It is commonly ſaid, that borax is prepared in the eaſtern countries, from a green ſaline liquor, which runs from certain hills, and is received in pits lined with clay, and ſuffered to evaporate by the ſun's heat; that a bluiſh mud, which the liquor brings along with it, is frequently ſtirred up, and a bituminous matter which floats upon the ſurface taken off; that when the whole is reduced to a thick conſiſtence, ſome melted fat is mixed, the matter covered with dry vegetable ſubſtances, and a thin coat of clay; and that when the ſalt has cryſtallized, it is ſeparated from the earth by a ſieve.

In the ſame countries is found, in conſiderable quantities, a native mineral alkaline ſalt on the ſurface of the earth, ſometimes tolerably pure, more commonly blended with heterogeneous matters of various colours; the nitrum or natron of the ancients, the baurach of the Arabians. This alkali appears to be the ſame with the baſis of the ſea-ſalt, and with the lixivial ſalt of kali or kelp, and ſome other maritime plants. It differs from the common vegetable alkalies, in being milder and leſs acrid in taſte, aſſuming a cryſtalline appearance, not deliquiating in the air, or very ſlowly; forming with the marine acid a perfect ſea-ſalt, with the nitrous quadrangular nitre, and with the vitriolic, a ſal mirabile.

Mr. Pott received from Tranquebar, (where the greateſt quantities of borax are made) a ſand, under the name of ore of borax, with an account that certain acrid vegetable matters were added in the preparation of the borax. The ore yielded, on elixation, only the mineral alkali, with a little ſea-ſalt.

The mineral alkali appears, from experiment, to be a principal ingredient in borax. On treating borax with acids, about one fourth its weight of a peculiar ſaline ſubſtance, called ſedative ſalt, is ſeparated, and the reſiduum proves a combination of the alkali, with the acid employed: thus, when the marine acid is uſed, a genuine ſea-ſalt remains; when the nitrous, a quadrangular nitre; and when the vitriolic, a ſal mirabile. The ſubſtance ſeparated, joined to the mineral alkali, to the baſis of ſea-ſalt, or to the ſalt of kali, recompoſes borax again.

The properties of this ſubſtance, ſo far as they are known, are theſe: It is of a bright ſnowy whiteneſs, extremely light, compoſed of fine plates or ſcales, ſoft, and as it were unctuous to the touch, of no ſmell, of a bitteriſh taſte, accompanied with a ſlight impreſſion of coldneſs. It diſſolves difficultly in boiling water, and on the liquor's cooling, cryſtallizes on its ſurface into thin plates, which uniting and becoming larger, fall to the bottom. It likewiſe diſſolves, by the aſſiſtance of heat, in rectified ſpirit of wine: the ſolution ſet on fire burns with a green flame. Moiſtened and expoſed to a conſiderable heat, it in part ſublimes; by repeated humectations the whole may be elevated. Whilſt dry, it proves perfectly fixed: it melts, emits aqueous vapours, and runs into a vitreous ſubſtance, diſſoluble again as at firſt: neither the glaſs nor the ſalt itſelf are affected by the air. It makes no change in the colour of blue flowers. It unites with the common alkaline ſalts, in ſome degree neutralizes, and renders them capable of cryſtallization. It is ſaid to expel from alcalies every acid except the vitriolic, though expelled itſelf by every acid from the alcaline baſis of the borax.

Thus we find borax compoſed of two principles, one every where plentiful, another which has not hitherto been obtained but from borax itſelf; the laſt in the ſmalleſt proportion. How far this peculiar ſubſtance is natural or artificial, of mineral or of vegetable origin, is wholly unknown.

With regard to the refining of borax, the rough ſalt is ſaid by ſome to be diſſolved in lime-water, by others in a lixivium of cauſtic alkali, and by others in alum water. This much is certain, that borax diſſolved in common water, and cryſtallized in the common manner, forms extremely ſmall cryſtals: that theſe differ in ſeveral reſpects from the refined borax of the ſhops, inſomuch that Cramer calls the latter not a purified but adulterated borax; that borax ſhoots into larger cryſtals when diſſolved in lime-water, than in common water; and when the veſſel is covered, and a gentle warmth continued during the cryſtallization, than in other circumſtances.

It is obſervable, that borax, during its diſſolution, appears tenacious, and adheres in part to the bottom of the veſſel: from this glutinous quality, peculiar to borax among the ſalts, it is employed by the dyers for giving a gloſs to ſilks. It is alſo of the greateſt uſe in ſoldering metals. See SOLDERING.

BORBORITES, *Borboritæ*, in church hiſtory, a ſect of Gnoſtics in the ſecond century, who, beſides embracing the errors of theſe heretics, denied the laſt judgment.

Their name comes from βορβορος, filth, on account of a cuſtom they had of daubing their faces and bodies with dirt and filth.

BORDAT, in commerce, a ſmall narrow ſtuff, which is manufactured in ſome parts of Egypt, particularly at Cairo, at Alexandria, and at Damieta.

BORDERS, in gardening, are of four ſorts: thoſe are the moſt common that are continued about parterres without any interruption, and wrought with a gentle riſing in the middle, like an aſs's back, and planted with low ſhrubs and flowers.

The ſecond ſort of borders are ſuch as are cut into compartments, at convenient diſtances, by ſmall paſſages, and being alſo raiſed in the middle, as before-mentioned, are likewiſe ſet off with ſhrubs.

The third ſort are ſuch as are laid even and flat, without flowers, having only a verge of graſs in the middle, being edged with two ſmall paths, raked ſmooth and ſanded. Theſe are ſometimes garniſhed with flowering ſhrubs, and flowers of large growth; or with vaſes and flower-pots placed regularly along the middle of the verge of graſs.

The fourth ſort are quite plain, and are only ſanded, as in the parterres of orangery; and are filled with caſes ranged in a regular order along thoſe borders, which are edged with box on the ſides next the walks; and on the other, with verges and graſs-work next the parterre. Sometimes a yew is planted between each caſe, which makes the border appear richer, and the parterres handſomer, during the winter ſeaſon.

Borders are either made ſtraight, circular, or in cants; and are turned into knots, ſcrolls, voluces, and other compartments.

Floriſts alſo make borders, either in long walks, or detached; and in theſe they raiſe their fineſt and choiceſt flowers. Theſe are frequently encompaſſed with border-boards painted green, which makes them look exceeding neat.

But in large parterres, this is not to be expected; ſince if they be ſtocked with flowers, ſucceeding one another in their ſeveral ſeaſons, it is ſufficient, ſo that nothing appears bare and naked.

It is uſual to diſcontinue the borders at the ends next to the houſe, that the embroidery and riſe of the parterre may not be hidden by the ſhrubs and flowering plants, and that the deſign may be better judged of.

And ſometimes there are branched out of it foliage, palm-leaves, and ſhells ſporting among the ſands.

As the modern taſte of parterres, ſcroll borders, and fret work in box, has been juſtly baniſhed our gardens: ſo I have only mentioned them here, to expoſe the taſte of thoſe architect-gardeners, who have no idea of the noble ſimplicity of an open lawn of graſs, properly bounded by plantations; but inſtead of this, divide that part of the garden, near the houſe, into various forms of borders edged with box, and ſand or gravel-walks leading about them; by which the ground is cut into many angles, ſcrolls, &c. which is very hurtful to the eye of a judicious perſon; therefore, where flowers are deſired, there may be borders continued round the extent of the lawn, immediately before the plantations of ſhrubs; which, if properly planted with hardy flowers to ſucceed each other, will afford a much more pleaſing proſpect than the ſtiff borders made in ſcrolls and compartments, after the French manner, can poſſibly do.

Theſe borders may be made ſix or eight feet wide, in proportion to the extent of the garden, and ſize of the lawn: for a ſmall lawn ſhould not have very broad borders; nor ought a large lawn to be bounded by ſmall borders; ſo that a due proportion ſhould be always obſerved in the laying out of gardens. *Miller's Gardener's Dictionary*.

BORD-FREE. See the article FREE.

BORD-HALFPENNY, a ſmall toll, by cuſtom paid to the lord of the town for ſetting up boards, tables, booths, &c. in fairs and markets.

Bord Lands, the demeſnes which lords keep in their hands for the maintenance of their board or table.

Bord-Lode, a ſervice required of tenants to carry timber out of the woods of the lord to his houſe. It is alſo uſed to ſignify the quantity of proviſion which the bordarii or bordmen paid for their bord-lands.

Bord Service, the tenure of bord-lands, by which ſome lands in certain places are held of the biſhop of London, and the tenants now pay ſixpence per acre, in lieu of finding proviſion anciently for their lord's table.

BORDURE, in heraldry, a cutting off from within the eſcutcheon all round it, about $\frac{1}{5}$ of the field, ſerving as a difference in a coat of arms, to diſtinguiſh families of the ſame name, or perſons bearing the ſame coat. If the line, conſtituting the bordure, be ſtraight, and the bordure be plain, then in blazoning you muſt only name the colour of the bordure.

Bordures are ſometimes ingrailed, gobonated, invicted, &c. See the articles Ingrailed, &c.

If the bordure be charged with any part of plants or flowers, the term is verdoy of trefoils, or whatever flower it be. If it conſiſts of ermins, vairy, or any of the furs, they ſay purflew of ermins, &c. If the bordure be charged with martlets, the word is charged with an enalyron of martlets, &c.

Bordures are ſymbols of protection, favour and reward, and as ſuch, kings beſtow them on thoſe they have a value for.

BORE, among engineers, denotes the diameter of the barrel of a gun, or cannon, or rather its whole cavity.

Square Bore, among mechanics, a ſquare piece of well tempered ſteel, fitted into a handle, ſerving to widen holes, and making them perfectly round.

BOREAL, in a general ſenſe, ſomething relating to the north. Thus,

Boreal-Signs, in aſtronomy, are the firſt ſix ſigns of the zodiac, or thoſe northwards of the equinoctial.

Aurora-Borealis. See Aurora.

BOREAS, a Greek name, now in common uſe for the north wind.

Pezron obſerves, that anciently Boreas ſignified the north-eaſt wind, blowing at the time of the ſummer ſolſtice. Boreas is repreſented, in painting, like an old man with a horrible look, his hair and beard covered with ſnow or hoar froſt, with the feet and tail of a ſerpent.

BORING, in a general ſenſe, the art of perforating or making a hole through any ſolid body.

Boring *of Water Pipes*. See Pipes.

Boring, in farriery, an operation in uſe for the cure of wrenched ſhoulders in horſes. It is this: having cut a hole in the ſkin, over the part affected, they blow it up with a tobacco pipe, as a butcher does a ſhoulder of veal; after which they thruſt a cold flat iron, like the point of a ſword blade, eight or ten inches up between the ſhoulder blade and the ribs: this they call boring.

Boring, in mineralogy, a method of piercing the earth with ſcooping irons, which, being drawn back at proper times, bring up with them ſamples of the different ſtrata through which they have paſſed; by the examination of which the ſkilful mineraliſt will be able to gueſs whereabouts a vein of ore may lie, or whether it will be worth while to open a mine there or no.

BOROUGH, Burrough, Borow, or Burgh, a corporation, or town, which is not a city. The word, in its original ſignification, meant a company, conſiſting of ten families, which were bound together as each other's pledge. Afterwards borough came to ſignify a town, having a wall or ſome kind of encloſure round it: and all places that in old time had the name of borough, it is ſaid, were fortified or fenced in ſome ſhape or other. Borough is a place of ſafety and privilege: and ſome are called free burghs, and the tradeſmen in them free burgeſſes, from a freedom they had granted to them originally, to buy and ſell without diſturbance, and exempt from toll.

Borough is now particularly appropriated to ſuch towns or villages as ſend burgeſſes or repreſentatives to parliament, whether they be incorporated or not.

They are diſtinguiſhed into thoſe by charter or ſtatute, and thoſe by preſcription or cuſtom: the number in England is 149, ſome of which ſend one, but the moſt of them two repreſentatives.

Royal Boroughs, in Scotland, are corporations made for the advantage of trade, by charters granted by ſeveral of their kings, having the privilege of ſending commiſſioners to repreſent them in parliament, beſides other peculiar immunities. They form a body of themſelves, and ſend commiſſioners each to an annual convention at Edinburgh, to conſult the benefit of trade, and their general intereſt.

Borough-English, a cuſtomary deſcent of lands or tenements, in certain places, by which they deſcend to the youngeſt inſtead of the eldeſt ſon; or if the owner have no iſſue, to the younger inſtead of the elder brother. This cuſtom goes with the land, although there be a deviſe or feoffment at the common law to the contrary. The reaſon of this cuſtom, ſays Littleton, is becauſe the youngeſt is preſumed, in law, to be the leaſt able to provide for himſelf.

Borough-Head, or Headborough, called alſo borough-holder, or burſholder, the chief man of the decenna, or hundred, choſen to ſpeak and act in behalf of the reſt.

Headborough alſo ſignifies a kind of head conſtable, where there are ſeveral choſen as his aſſiſtants, to ſerve warrants, &c. See the article Constable.

BORRELLISTS, in church hiſtory, a Chriſtian ſect in Holland. They are a kind of anabaptiſts; but they have ſome very particular opinions. They reject the uſe of churches, of the ſacraments, public prayer, and all other external acts of worſhip. They aſſert, that all the Chriſtian churches of the world have degenerated from the pure apoſtolical doctrines, becauſe they have ſuffered the word of God, which is infallible, to be expounded, or rather corrupted, by doctors, who are not infallible. They lead a very auſtere life, and employ a great part of their goods in alms.

BOS, the ox, in zoology, a genus of quadrupeds, of the order of the pecora, the characters of which are, that the horns are hollow and turned forward, bent like creſcents, and ſmooth on the ſurface.

Of this genus, authors enumerate the five following ſpecies, *viz.* 1. The common tame kind. 2 The bonaſus 3. The biſon. 4. The bubalus. 5. The urus. See the articles Bonasus, Bison, &c.

BOSCAGE, the ſame with a grove, or thicket.

Boscage, in a law ſenſe, is that food which trees yield to cattle, as maſt, &c. But Manwood ſays, to be quit of boſcage, is to be diſcharged of paying any duty for wind-fall wood in the foreſt.

Boscage, among painters, denotes a landſcape repreſenting much wood and trees.

BOSQUETS, in gardening, are groves, or ſmall plantations of trees.

The word is derived from *boſchetto*, Italian, a diminutive of *boſco*, a wood or grove.

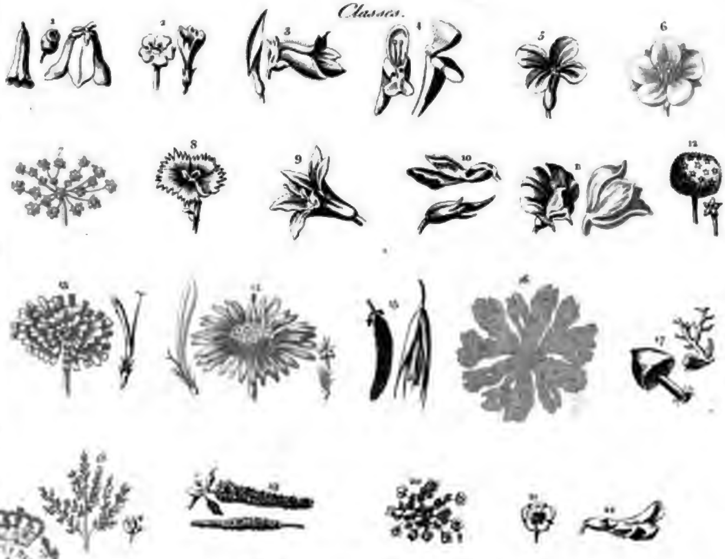
Theſe ſmall compartments in gardens are formed of trees, ſhrubs, or tall large-growing plants, planted in quarters; and are either diſpoſed regularly in rows, or in a more wild and accidental manner, according to the fancy of the owner: theſe quarters are commonly ſurrounded with ever-green hedges, and the entrances formed into regular porticoes with yews, which are by far the beſt and moſt proper trees for this purpoſe. In the inſide of theſe quarters may be made ſome walks, either ſtraight or winding; which, if the quarters are large, ſhould be ſix or eight feet broad, and may be laid with turf, and kept well mowed and rolled, which will render the walking much eaſier and pleaſanter than if the walks are only the common earth, which in ſmaller quarters cannot be otherwiſe; for if the trees are cloſe, and the walks narrow, ſo as to be ſhaded and over-hung by the trees, the graſs will not grow.

These quarters may be alſo ſurrounded with hedges of lime, elm, horn-beam, or beach; which ſhould be kept well ſheared, and not ſuffered to riſe too high, that the heads of the trees may be fully ſeen over them, and the

ſtems

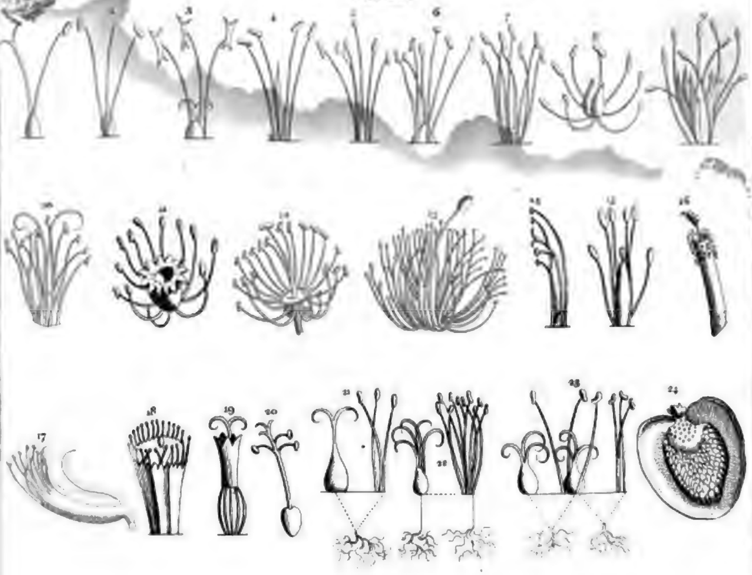
Tournefort's System of Botany.

Classes.



The Linnaean System of Botany.

Classes.



ſtems only hid from the ſight, when in the walks on the outſide of the quarters.

In planting of theſe boſquets, you ſhould obſerve to mix the trees which produce their leaves of different ſhapes, and various ſhades of green, and hoary or mealy leaves, ſo as to afford an agreeable proſpect; beſides, there is a great variety of different fruits, which theſe trees produce in autumn; which, although of little or no uſe that we know of, yet have a very good effect, in affording an agreeable variety for ſome time after the leaves are gone; as the euonymus, or ſpindle-tree, the opulus, or marſh-elder, the cock-ſpur-hawthorn, with many other ſorts, too numerous to mention in this place. But I would adviſe never to mix ever-greens with deciduous trees; for, beſides the ill effect it hath to the ſight, eſpecially in winter, they ſeldom thrive well together; ſo that thoſe quarters where you intend to have ever-greens, ſhould be wholly planted therewith; and in the other parts mix as many varieties of different trees, which caſt their leaves, as you can conveniently; and alſo plant ſome of the largeſt-growing flowers, eſpecially near the outſide of the quarters, which will add greatly to the variety, if they have but air enough to grow; but if any of the ever-green trees are mixed with the deciduous, it ſhould be only to border the wood.

Theſe boſquets are proper only for ſpacious gardens, being expenſive in their firſt making, as alſo in keeping. *Miller's Gard. Dict.*

BOSSAGE, in architecture, a term uſed for any ſtone that has a projecture, and is laid rough in a building, to be afterwards carved into mouldings, capitals, coats of arms, &c.

BOSSAGE is alſo that which is otherwiſe called ruſtic work, and conſiſts of ſtones which advance beyond the naked, or level, of the building, by reaſon of indentures or channels left in the joinings. Theſe are chiefly uſed in the corners of edifices, and thence called ruſtic quoins. The cavities or indentures are ſometimes round, ſometimes chain-framed, or bevelled, ſometimes in a diamond form, and ſometimes incloſed with a cavetto, and ſometimes with a liſtel.

BOSTANGIS, in the Turkiſh affairs, perſons employed in the garden of the ſeraglio, out of whoſe number are collected thoſe who are to row in the grand ſeignior's barges, when he has a mind to divert himſelf with fiſhing, or take the air upon the canal. They who row on the left hand are only capable of mean employments in the gardens; but they who row on the right hand may be promoted to the charge of boſtangi-bachi, who has the general intendancy over all the grand ſeignior's gardens, and commands above ten thouſand boſtangis.

BOTALE FORAMEN, in anatomy, a name given to the foramen ovale, from Botall, phyſician to Charles IX. to whom the diſcovery of it is aſcribed. See the articles HEART and FORAMEN OVALE.

BOTANIST, a perſon ſkilled in botany, and conſequently capable of aſſigning to every plant its proper characters and name.

BOTANY, the ſcience of plants, their ſeveral kinds, their forms, virtues, and uſes.

The word is Greek, *βοτανη*, an herb, which is derived from *βοω*, to feed; becauſe moſt animals feed on vegetables.

The moſt eminent botaniſts among the ancients were Hippocrates, Theophraſtus, Dioſcorides, Pliny, Galen, &c. In the ſixteenth century, the ancient botany, which had been loſt for ages, was induſtriouſly revived by Leonicenus, Braſavolus, Cordus, Fuchſius, Matthiolus, Dalechampius, &c. Theſe were ſoon after joined by others, and by their induſtry the art was firſt reduced into a body or ſyſtem; as Geſner, Dodonæus, Cæſalpinus, Cluſius, Lobel, Columna, Proſper Alpinus, the two Bauhins, Plunket, Bucconi, &c. Theſe were ſucceeded by others, who have laboured ſucceſsfully to bring the ſcience of botany ſtill nearer to perfection. Among theſe are Morriſon, Malpighi, Hermannus, Ray, Magnol, Tournefort, Sloan, Sherrard, Boerhaave, Linnæus, and many others.

The ſcience of botany is differently explained by different authors; but the two ſyſtems of Tournefort and Linnæus more eſpecially deſerve our conſideration: we ſhall begin with the former.

According to Tournefort, all plants are ranged under one or other of the following claſſes, viz. 1. Plants with monopetalous, campaniform, or bell-faſhioned flowers. 2. Thoſe with monopetalous, infundibuliform, or funnel-like flowers. 3. Plants with anomalous monopetalous flowers. 4. Plants with polypetalous labiated flowers. 5. Plants with polypetalous cruciform flowers. 6. Plants with polypetalous roſaceous flowers. 7. Plants with polypetalous, roſaceous, and umbellated flowers. 8. Plants with caryophylleous or pink-like flowers. 9. Plants with liliaceous or lily-like flowers. 10. Plants with polypetalous papilionaceous flowers. 11. Plants with polypetalous anomalous flowers. 12. Plants with floſculous flowers. 13. Plants with ſemifloſculous flowers. 14. Plants with radiated flowers. 15. Plants with ſtamineous flowers. 16. Plants without flowers, but having viſible ſeeds. 17. Plants with neither viſible flowers nor ſeeds. 18. Trees with apetalous flowers. 19. Trees with apetalous amentaceous flowers. 20. Trees with monopetalous flowers. 21. Trees with roſaceous flowers. 22. Trees with papilionaceous flowers: the deſcription of each of which ſee under their ſeveral heads, MONOPETALOUS, CAMPANIFORM, &c. See alſo plate XX. *Tournefort's Claſſes.*

Linnæus has eſtabliſhed an entirely new ſyſtem of botany, founded on the number and different ſtructure obſervable in the male and female parts of generation of each plant; the former of which is called ſtamen, or ſtamina, when there are more than one of them; and the latter piſtil. See the articles STAMEN and PISTIL.

From the number and ſituation of the ſtamina, he has arranged the whole family of plants under twenty-four claſſes, viz. 1. The monandria. 2. Diandria. 3. Triandria. 4. Tetrandria. 5. Pentandria. 6. Hexandria. 7. Heptandria. 8. Octandria. 9. Enneandria. 10. Decandria. 11. Dodecandria. 12. Icoſandria. 13. Polyandria. 14. Didynamia. 15. Tetradynamia. 16. Monadelphia. 17. Diadelphia. 18. Polyadelphia. 19. Syngeneſia. 20. Gynandria. 21. Monoecia. 22. Dioecia. 23. Polygamia. 24. Cryptogamia. See the articles MONANDRIA, DIANDRIA, &c. See alſo plate XX. *Linnæus's Claſſes.*

Theſe are the general claſſes of plants eſtabliſhed by that excellent botaniſt; who farther ſubdivides them into orders, which he denominates monogynia, digynia, trigynia, &c. from the number of piſtils, or female parts of generation, found in each plant. See the articles MONOGYNIA, DIGYNIA, TRIGYNIA, &c.

The ſame celebrated naturaliſt has likewiſe diſtributed the vegetable part of the creation into different orders, from the form and ſtructure of the calyx, or cup, of their flowers: but as this has no connection with the method laid down, we muſt refer the reader to his Genera Plantarum, where they will find it explained, as alſo to the article CALYX.

BOTE, *Bota*, in our old law books, ſignifies recompence or amends: thus a man-bote is a compenſation for a man ſlain.

There are likewiſe houſe-bote and plough-bote, privileges to tenants, of cutting wood for making ploughs, repairing tenements, and likewiſe for fewel.

BOTRYS, in botany, a low ſomewhat hairy plant, full of branches, bearing numerous imperfect flowers: the flower ſtands in a five-leaved cup, which forms a covering to a ſmall roundiſh ſeed.

There are two ſpecies of this plant, called Jeruſalem oak, and Mexico tea; both natives of the ſouthern parts of Europe, and ſown annually with us in gardens. The leaves and flowery heads have a pretty ſtrong and not unpleaſant ſmell, and a moderately ſomewhat bitteriſh taſte: on much handling them, an unctuous reſinous juice adheres, in conſiderable quantity, to the fingers. The proper menſtruum of their active matter is rectified ſpirit: they nevertheleſs give out their more valuable parts to boiling water alſo, which they impregnate ſtrongly with their ſmell, and conſiderably with their taſte. The infuſions, which are not unpalatable, drank as tea, are ſaid to be of ſervice in humoural aſthmas and coughs, and other diſorders of the breaſt: they are ſuppoſed alſo to be antiſpaſmodic and antihyſteric.

BOTTOM, in navigation, is uſed to denote as well the channel of rivers and harbours, as the body or hull of a ſhip: thus, in the former ſenſe, we ſay, a gravelly bottom, ſandy bottom, &c. and in the latter ſenſe, a Britiſh bottom, a Dutch bottom, &c.

BOTTOMRY, in commerce, a marine contract for the borrowing of money upon the keel or bottom of a ſhip; that is to ſay, when the maſter of a ſhip binds the ſhip itſelf, that if the money be not paid by the time appointed, the creditor ſhall have the ſaid ſhip.

Bottomry is alſo where a perſon lends money to a merchant who wants it in traffic, and the lender is to be paid a greater ſum at the return of the ſhip, ſtanding to the hazard of the voyage. On which account, though the intereſt be greater than what the law commonly allows, yet it is not uſury, becauſe the money being furniſhed at the lender's hazard, if the ſhip periſhes, he ſhares in the loſs.

BOTTONY. A croſs bottony, in heraldry, terminates at each end in three buds, knots, or buttons, reſembling, in ſome meaſure, the three-leaved graſs; on which account, Segoing, in his Treſor Heraldique, terms it croix trefflee. It is the badge of the order of St. Maurice.

BOULDER-WALL, a kind of wall built of round flints or pebbles, laid in a ſtrong mortar, and uſed where the ſea has a beach caſt up, or where there are plenty of flints.

BOULTINE, a term which workmen uſe for a moulding, the convexity of which is juſt one fourth of a circle, being the member next below the plinth in the Tuſcan and Doric capital.

BOUNTY, in commerce, a premium paid by the government to the exporters of certain Britiſh commodities, as ſail-cloth, gold and ſilver lace, ſilk ſtockings, fiſh, corn, &c. See the articles Sail-Cloth, Lace, Fish, Corn, &c.

BOURDONEE, in heraldry, the ſame with pomee. See the article Pomee.

BOURIGNONISTS, the name of a ſect among the Low Country proteſtants, being ſuch as follow the doctrine of Antoinette Bourignon, a native of Liſle, and apoſtate of the Roman catholic religion.

The principles of this ſect bear a very near reſemblance with thoſe of the quietiſts, quakers, or fanatics. They conduct themſelves by pretended revelations.

BOUTANT, or Arch-Boutant, in architecture, a flat arch or part of an arch, abutting againſt the reins of a vault, to prevent its giving way.

A Pillar Boutant is a large chain or pile of ſtone, made to ſupport a wall, terrace, or vault.

BOUTS-Rimez, in French poetry, a term ſignifying certain rhymes diſpoſed in order, and given to a poet, together with a ſubject, to be filled up with verſes ending in the ſame word and ſame order. In chooſing the rhymes, it is uſual to fix on ſuch as ſeem the remoteſt, and have the leaſt connection. Some authors fancy, that theſe rhymes are, of all others, the eaſieſt, that they aſſiſt the invention, and furniſh new thoughts.

BOW, *Arcus*, a weapon of offence made of ſteel, wood, horn, or other elaſtic matter, which, after being bent by means of a ſtring faſtened to its two ends, in returning to its natural ſtate, throws out an arrow with prodigious force.

The uſe of the bow is, without all doubt, of the earlieſt antiquity. It has likewiſe been the moſt univerſal of all weapons, having obtained amongſt the moſt barbarous and remote people, who had the leaſt communication with the reſt of mankind.

The bow is a weapon of offence amongſt the inhabitants of Aſia, Africa, and America, at this day; and in Europe, before the invention of fire-arms, a part of the infantry were armed with bows. Lewis XI. firſt aboliſhed the uſe of them in France, introducing, in their place, the halbert, pike, and broad-ſword. The long bow was formerly in great vogue in England, and many laws were made to encourage the uſe of it. The parliament under Henry VII. complained of the diſuſe of long bows, heretofore the ſafeguard and defence of this kingdom, and the dread and terror of its enemies.

Bow is alſo an inſtrument formerly uſed at ſea for taking the ſun's altitude; conſiſting of a large arch of ninety degrees graduated, a ſhank or ſtaff, a ſhade vane, a ſight vane, and an horizon vane. It is now out of uſe.

Bow, in naval architecture, the round part of a ſhip's ſide forward, reaching from where the planks begin to bend inward, till they cloſe at the ſtem or prow. A ſhip with a narrow bow is commonly found to ſail faſter than with a broad one; but is not ſo well calculated for a high ſea, being apt, for want of ſufficient reſiſtance, to plunge her fore-part very deep, and endanger the maſts and rigging, as well as ſtrain the hull: the former of theſe is called, by ſeamen, a lean, and the latter a bluff-bow.

Bow, among builders, a beam of wood or braſs, with three long ſcrews, that direct a lath of wood or ſteel to any arch; chiefly uſed in drawing draughts of ſhips, and projections of the ſphere; or wherever it is requiſite to draw large arches.

Bow, in muſic, a ſmall machine, which, being drawn over the ſtrings of a muſical inſtrument, makes it reſound. It is compoſed of a ſmall ſtick, to which are faſtened eighty or an hundred horſe-hairs, and a ſcrew which ſerves to give theſe hairs the proper tenſion. In order that the bow may touch the ſtrings briſkly, it is uſual to rub the hairs with roſin.

Bow, among artificers, an inſtrument ſo called from its figure; in uſe among gunſmiths, lockſmiths, watchmakers, &c. for making a dril go. Among turners, it is the name of that pole fixed to the ceiling, to which they faſten the cord that whirls round the piece to be turned.

Bows *of a Saddle* are two pieces of wood laid archwiſe to receive the upper part of a horſe's back, to give the ſaddle its due form, and to keep it tight.

The fore bow, which ſuſtains the pommel, is compoſed of the withers, the breaſts, the points or toes, and the corking. See the article Withers, &c.

The hind bow bears the trouſequin or quilted roll. The bows are covered with ſinews, that is, with bulls pizzles beaten, and ſo run all over the bows to make them ſtronger: then they are ſtrengthened with bands of iron to keep them tight, and on the lower ſide are nailed to the ſaddle ſtraps, with which they make faſt the girths.

BOWLINE, amongſt ſeamen, a rope faſtened to the leech or perpendicular edge of the ſquare ſails, in three or four parts, called bridles; they are only uſed on the weather or wind-ſide, to keep the ridge of the ſail tight forward, which would otherwiſe be always ſhivering as the ſhip ſails on a ſcant ſide wind: for an illuſtration of this, ſee the article Close-Hauled.

BOWSING, amongſt ſeamen, pulling on a tackle on any body that is not ſuſpended by it; when that is the caſe, it is called hoiſting.

BOWSPRIT, in naval affairs, a large boom or maſt which projects over the ſtem, to carry ſail on, and govern the fore-part of the ſhip to counter-ballance the ſail carried behind, or in the after-parts; and likewiſe to ſupport the fore-maſt, by ropes ſtretched from the maſt-head to the outer-end of the bowſprit, called ſtays. See Boom and Stays.

BOX, in its moſt common acceptation, denotes a ſmall cheſt or coffer for holding things.

Box *of a Plough*, the croſs piece in the head of a plough, which ſupports the two crow-ſtaves. See Plough.

Box, in zoology, the ſame with boops. See the article Boops.

Box, or Box-Tree, in botany, the Engliſh name of the *buxus*. See Buxus.

BOXING, in navigation, the act of bracing a ſhip's fore-moſt or head-ſails aback, i. e. on the wind-ſide of the maſt, when, by the negligence of the man who ſteers, ſhe had deviated from her courſe, and inclined her motion nearer to the direction of the wind than the ſails would ſtand full. The uſe of boxing is to impreſs a greater force on the ſhip's fore-part than uſual, to turn it further from the courſe of the wind, till ſhe lies in the line of motion from which ſhe had declined.

BOYAU, in fortification, a ditch covered with a parapet, which ſerves as a communication between two trenches. It runs parallel to the works of the body of the place, and ſerves as a line of contravallation, not only to hinder the ſallies of the beſieged, but alſo to ſecure the miners. But when it is a particular cut that runs from the trenches to cover ſome ſpot of ground, it is drawn ſo as not to be enfiladed or ſcoured by the ſhot from the town.

BOYES, idolatrous prieſts among the ſavages of Florida.

Every prieſt attends a particular idol, and the natives addreſs themſelves to the prieſt of that idol to which they intend to pay their devotion.

The idol is invoked in hymns, and his uſual offering is the ſmoke of tobacco.

BOYLE's Lectures, a courſe of ſermons ſet on foot, in London, by the honourable Robert Boyle in 1691; the deſign of which is to prove the truth of the Chriſtian religion againſt infidels, without deſcending to any controverſies among Chriſtians.

BRABEUTES, or Brabeuta, βραβευτης, in antiquity, an officer among the Greeks, who preſided at the public games, and decided controverſies that happened among the antagoniſts in the gymnical exerciſes. The number of brabeutæ was not fixed; ſometimes there was only one, but more commonly they amounted to nine or ten.

BRACE is commonly taken for a couple or pair, and applied by huntſmen to ſeveral beaſts of game, as a brace of bucks, foxes, hares, &c.

Brace, or Brasse, is alſo a foreign meaſure, anſwering to our fathom. See Fathom.

Brace, in architecture, a piece of timber framed in with bevel joints, the uſe of which is to keep the building from ſwerving either way. When the brace is framed into the kingleſſes, or principal rafters, it is by ſome called a ſtrut.

Braces, in naval affairs, the ropes faſtened to the yard-arms or ends, to wheel or traverſe them about the maſts in a horizontal direction, for the more conveniently adapting the ſails to the wind.

BRACED, in heraldry, a term for the intermingling three cheoronels.

BRACELET, an ornament worn on the wriſt, much uſed among the ancients. It was made of different materials, and in different faſhions, according to the age and quality of the wearer.

BRACHIÆUS, in anatomy, an oblong, thick, and broad muſcle, lying immediately on the anterior part of the lower half of the os humeri. The upper part of it is forked or ſloped, and at the bending of the joint of the elbow, the lower part contracts.

It is fixed to the ſurface of the os humeri by a great number of fleſhy fibres, from the lower inſertion of the deltoides, almoſt down to the two foſſæ at the lower extremity of the bone, and from one edge of the foreſide of this lower extremity to the other. The fibres are for the moſt part longitudinal, thoſe neareſt the ſurface of the muſcle being longeſt, the more internal growing gradually ſhorter.

The lateral fibres are a little oblique, and this obliquity increaſes in thoſe that lie loweſt. Theſe lateral fibres are partly fixed in the intermuſcular ligaments of the os humeri, of which ligaments, that which lies toward the internal condyle is longer and broader than that toward the external condyle. The loweſt of theſe fibres are very oblique, and form on each ſide a kind of ſmall ſeparate faſciculus.

In paſſing over the joint, all theſe fibres contract in breadth, and afterwards end in a ſtrong flat tendon inſerted in the muſcular impreſſion, which is directly below the coronoide apophyſis of the ulna. This muſcle adheres very ſtrongly to the capſular ligament, and ſome of its fleſhy fibres terminate therein.

The ſloped or forked ſuperior extremity of this muſcle embraces the large tendon of the deltoides. The internal point of the fork meets the inferior inſertion of the coracobrachialis; and the fore-ſide of the whole muſcle is covered by the two fleſhy bodies of the biceps.

BRACHIUM, Arm, in anatomy, one of the ſuperior extremities of the human body, comprehending the ſcapula, the os humeri, the cubit, and the hand. See the articles Scapula, Arm, &c.

BRACHMANS, a ſect of Indian philoſophers, known to the ancient Greeks by the name of Gymnoſophiſts. The ancient Brachmans lived upon herbs and pulſe, and abſtained from every thing that had life in it. They lived in ſolitude without matrimony, and without property; and they wiſhed ardently for death, conſidering life only as a burden. The modern Brachmans make up one of the caſts or tribes of the Banians. They are the prieſts of that people, and perform their office of praying and reading the law, with ſeveral mimical geſtures, and a kind of quavering voice. They believe that, in the beginning, nothing but God and the water exiſted; and that the Supreme Being, deſirous to create the world, cauſed the leaf of a tree, in the ſhape of a child playing with its great toe in its mouth, to float on the water: from its navel there iſſued out a flower, whence Brama drew his original, who was intruſted by God with the creation of the world, and preſides over it with an abſolute ſway. They make no diſtinction between the ſouls of men and brutes, but ſay the dignity of the human ſoul conſiſts in being placed in a better body, and having more room to diſplay its faculties. They allow of rewards and puniſhments after this life; and have ſo great a veneration for cows, that they look on themſelves as bleſſed, if they can but die with the tail of one of them in their hand. They have preſerved ſome noble fragments of the knowledge of the ancient Brachmans. They are ſkilful arithmeticians, and calculate, with great exactneſs, eclipſes of the ſun and moon. They are remarkable for their religious auſterities. One of them has been known to make a vow, to wear about his neck a heavy collar of iron for a conſiderable time: another to chain himſelf by the foot to a tree, with a firm reſolution to die in that place; and another to walk in wooden ſhoes ſtuck full of nails on the inſide. Their divine worſhip conſiſts chiefly of proceſſions, made in honour of their deities. They have a college at Banara, a city ſeated on the Ganges.

BRACHYGRAPHY, the art of ſhort-hand writing. The word is compounded of the Greek βραχυς, ſhort, and γραφω, to write.

BRACKET, among carpenters, &c. a kind of wooden ſtay, ſerving to ſupport ſhelves, and the like.

Brackets, in naval architecture, ſhort crooked timbers reſembling knees, fixed in the frame of a ſhip's head to ſupport the gratings.

Brackets, in gunnery, are the cheeks of the carriage of a mortar: they are made of ſtrong planks of wood, of almoſt a ſemicircular figure, and bound round with thick iron plates; they are fixed to the beds by four bolts, which are called bed bolts; they riſe up on each ſide of the mortar, and ſerve to keep her at any elevation, by means of ſome ſtrong iron bolts, called bracket-bolts, which go through theſe cheeks or brackets.

BRACTEA, in natural hiſtory, denotes a ſpangle, or thin flake of any ſubſtance.

Bractea, in botany, denotes the floral leaf. See the article Floral Leaf.

BRACTEARIA, in natural hiſtory, a genus of talcs, compoſed of ſmall plates in form of ſpangles, each plate being either very thin, or diviſible into very thin ones.

BRADS, among artificers, a kind of nails uſed in building, which have no ſpreading heads, as other nails have. They are diſtinguiſhed, by ironmongers, by ſix names, as joiner's-brads, flooring-brads, batten-brads, bill-brads, or quarter-heads, &c. Joiner's brads are for hard wainſcot, batten-brads for ſoft wainſcot; bill-brads are uſed when a floor is laid in haſte, or for ſhallow joiſts ſubject to warp. See the article Nail.

BRADYPUS, in zoology, a genus of quadrupeds, of the order of the anthropomorpha of Linnæus, otherwiſe called *ignavus*, and in Engliſh, the ſloath; the characters of which are, that its feet have no great toe, and are made for climbing. See the article Anthropomorpha.

Of this genus there are two ſpecies. 1. The American ſloath, with a ſhort tail, and only three toes on each foot. 2. The Ceylon ſloath, with only two toes on each foot, and no tail.

BRAGGET, a kind of drink made of malt, honey, and ſpices, much uſed in Wales.

BRAILS, in naval affairs, ropes fixed to different places on the mizen above and below, to gather it up cloſe to the maſt when it is not required.

Brails is likewiſe a general name given to all the ropes which haul the bottoms, edges, and lower corners of the other ſails up to their yards, for the more eaſily furling them; and this is called brailing them up, or hauling them up in the brails.

BRAIN, in anatomy, a name given to all that maſs which fills the cavity of the cranium, and which is immediately ſurrounded by two membranes, called meninges by the Greeks, and matres by other ancients, becauſe they were commonly of opinion that theſe membranes were the origin, and, as it were, the mother of all the other membranes of the body.

This general maſs is divided into three particular portions; the cerebrum, or brain, properly ſo called; the cerebellum, and medulla oblongata. To theſe three parts contained within the cranium, a fourth is added, which fills the great canal of the ſpina dorſi by the name of medulla ſpinalis, being a continuation of the medulla oblongata.

The meninges, or membranes, are two in number, one of which is very ſtrong, and lies contiguous to the cranium; the other is very thin, and immediately touches the brain. The firſt is named dura mater; the ſecond pia mater, which is again divided into two, the external lamina being termed arachnoides, and the internal retaining the common name of pia mater. See the articles *Dura* Mater, and *Pia* Mater.

The cerebrum, properly ſo called, is a kind of medullary maſs, of a moderate conſiſtence, and of a greyiſh colour on the outer ſurface, filling all the ſuperior portion of the cavity of the cranium, or that portion which lies above the tranſverſe ſeptum. The upper part of the cerebrum is of an oval figure, like half an egg cut lengthwiſe, or rather like two quarters of an egg cut lengthwiſe, and parted a little from each other. It is flatter on the lower part, each lateral half of which is divided into three eminences, called lobes, one anterior, one middle, and one poſterior.

The ſubſtance of the cerebrum is of two kinds, diſtinguiſhed by two different colours; one part of it, which is the ſofter, being of a greyiſh or aſh-colour; the other, which is more ſolid, very white. The aſh-coloured ſubſtance lies chiefly on the outer-part of the cerebrum, like a kind of cortex; from whence it has been named ſubſtantia corticalis or cinerea. The white ſubſtance occupies the inner part, and is named ſubſtantia medullaris, or ſimply ſubſtantia alba.

The cerebrum is divided into two lateral portions, ſeparated by the falx, or great longitudinal ſeptum of the dura mater. They are generally termed hemiſpheres; but they are more like quarters of an oblong ſpheroid. Each of theſe portions is divided into two extremities, one anterior, and one poſterior, which are termed the lobes of the cerebrum, between which there is a large inferior protuberance which goes by the ſame name; ſo that in each hemiſphere there are three lobes, one anterior, one middle, and one poſterior.

The anterior lobes lie upon thoſe parts of the os frontis which contribute to the formation of the orbits and of the frontal ſinuſes, commonly called the anterior foſſæ of the baſis cranii. The poſterior lobes lie on the tranſverſe ſeptum; and the middle lobes, in the middle or lateral foſſæ of the baſis cranii.

Each lateral portion of the cerebrum has three ſides, one ſuperior, which is convex; one inferior, which is uneven; and one lateral, which is flat; and turned to the falx. Through the whole ſurface of theſe three ſides we ſee inequalities or windings like the circumvolutions of the inteſtines, formed by waving ſtreaks or furrows very deep and narrow, into which the ſepta, or duplicatures of the pia mater, inſinuate themſelves, and thereby ſeparate theſe circumvolutions from each other.

Near the ſurface of the cerebrum, theſe circumvolutions are at ſome diſtance from each other, repreſenting ſerpentine ridges; and in the interſtices between them, the ſuperficial veins of the cerebrum are lodged, between the two laminæ of the pia mater, by an infinite number of very fine vaſcular filaments, as may be ſeen by pulling the circumvolutions a little aſunder with the fingers.

When they are cut tranſverſly, we obſerve that the ſubſtantia alba lies in the middle of each circumvolution; ſo that there is the ſame number of internal medullary circumvolutions as of external cortical ones; the firſt repreſenting white laminæ inveſted by others of an aſh-colour; but the cortical ſubſtance is in many places thicker than the medullary.

The anterior and middle lobes of the cerebrum on each ſide are parted by a deep narrow ſulcus, which aſcends obliquely backward, from the temporal ala of the os ſphenoides to near the middle of the os parietale; and the two ſides of this diviſion have each their particular ridges and circumvolutions, which gives a very great extent to the cortical ſubſtance. This ſulcus is termed fiſſura magna ſilvii, or ſimply fiſſura cerebri.

The corpus calloſum is a white convex body, being a middle portion of the medullary ſubſtance, whoſe ſurface is covered by the pia mater. Along the middle of its ſurface, from one end to another, there is a kind of raphe formed by a particular intertexture of fibres, which croſs each other. After its uniting with the cortical ſubſtance, a medullary arch or vault of an oval figure is formed.

Under this arch are two lateral and ſhallow cavities, ſeparated by a tranſparent medullary ſeptum; and generally called the anterior ſuperior ventricles of the cerebrum.

The above tranſparent partition is generally called the ſeptum lucidum, and lies directly under the raphe or ſuture of the corpus calloſum, of which it is a continuation.

The ſeptum lucidum is united by its lower part to the anterior portion of that medullary body improperly called the fornix, with three pillars; becauſe it is thought to bear ſome reſemblance to the arches of ancient vaults.

The fornix being cut off and inverted, or quite removed, we firſt perceive a vaſcular web, called plexus choroides, and ſeveral eminences more or leſs covered by the expanſion of that plexus. There are four pairs of eminences, which follow each other very regularly, two large and two ſmall. The firſt pair of larger eminences are named corporal ſtriata, from their having a great number of white and aſh-coloured ſtreaks alternately diſpoſed thro' their ſubſtance; and the ſecond pair, thalami nervorum opticorum, becauſe theſe nerves ariſe chiefly from them. The four ſmall eminences are cloſely united together, the anterior being called nates, and the poſterior teſtes; though it would be better to call them ſimply, anterior and poſterior tubercles.

Immediately before theſe tubercles, there is a ſingle eminence called glandula pinealis, a ſmall, ſoft, greyiſh body, about the ſize of an ordinary pea, irregularly round, and ſometimes of the figure of a pine apple. This gland, which Des Cartes will have to be the ſeat of the ſoul, has been often found to contain gravel.

Between the baſis of the anterior pillar of the fornix, and the anterior part of the union of the optic thalami, lies a cavity or foſſula, called infundibulum. It runs down towards the baſis of the cerebrum, contracting gradually, and terminates by a membranous canal in a ſoftiſh body, ſituated in the ſella ſphenoidalis, named glandula pituitaria. The infundibulum opens above, immediately before the optic thalami, by an oval hole, called foramen commune anterius, and conſequently communicates with the lateral ventricles.

The cerebellum is contained under the tranſverſe ſeptum of the dura mater. It is broader laterally than on the fore or back-ſides, flatted on the upper-ſide, and gently inclined both ways, anſwerable to the ſeptum, which ſerves it as a kind of tent or ceiling. On the lower-ſide it is rounder, and on the back-ſide divided into two lobes, ſeparated by the occipital ſeptum of the dura mater.

It is made up, like the cerebrum, of two ſubſtances; but it has no circumvolutions on its ſurface. Its ſulci

are

PLATE XVI   Facing Brain

Fig. 1.

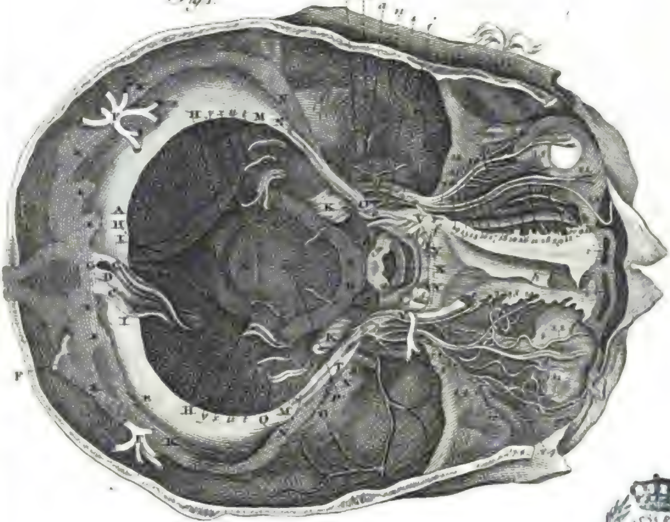

l m n o p i
H y z u t M N
A
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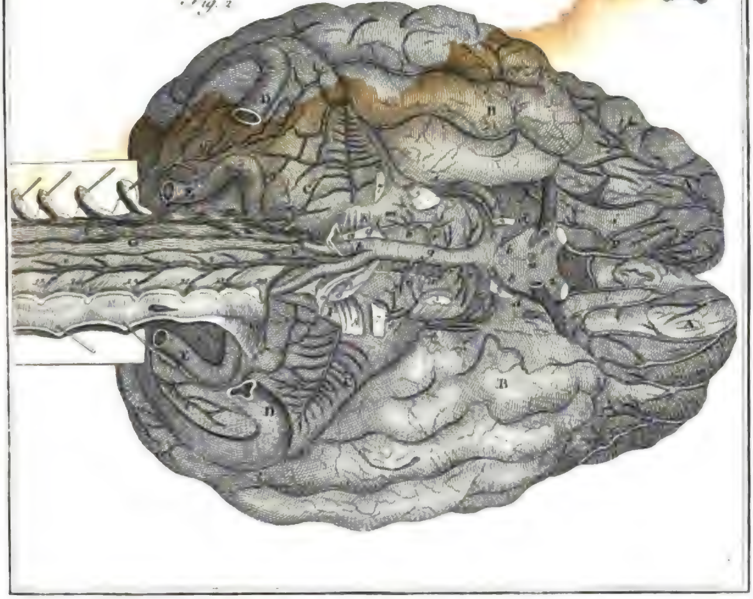
Fig. 2



are pretty deep, and diſpoſed in ſuch a manner as to form that flat ſtrata, more or leſs horizontal, between which the internal lamina of the pia mater inſinuates itſelf by a number of ſepta, equal to that of the ſtrata.

Under the tranſverſe ſeptum, it is covered by a vaſcular texture, which communicates with the plexus choroides. It has two middle eminences called appendices vermiformes, one anterior and ſuperior which is turned forward, the other poſterior and inferior which goes backward. There are likewiſe two lateral appendices, both turned outward. They are termed vermiformes from their reſemblance to a large portion of an earthworm.

Beſides the diviſion of the cerebellum into lateral portions, or into two lobes, each of theſe lobes ſeems to be likewiſe ſubdivided into three protuberances, one anterior, one middle or lateral, and one poſterior; but they are not in all ſubjects equally diſtinguiſhed either by their convexity or limits; but they may always be diſtinguiſhed by the direction of their ſtrata, thoſe of the middle and anterior protuberances being leſs tranſverſe than in the poſterior.

When we ſeparate the two lateral portions or lobes, having firſt made a pretty deep inciſion, we diſcover firſt of all the poſterior portion of the medulla oblongata; and in the poſterior ſurface of this portion, from the tubercula quadrigemina, all the way to the poſterior notch of the body of the cerebellum, we obſerve an oblong cavity, which terminates backward, like the point of a writing pen. This cavity is called the fourth ventricle.

The medulla oblongata is a medullary ſubſtance, ſituated from before backward, in the middle part of the baſis of the cerebrum and cerebellum, without any diſcontinuation, between the lateral parts of both theſe baſes; and therefore it may be looked upon as one middle medullary baſis, common to both cerebrum and cerebellum, by the reciprocal continuity of their medullary ſubſtances, thro' the great notch in the tranſverſe ſeptum of the dura mater, which common baſis lies immediately on that portion of the dura mater which lines the baſis of the cranium. The medulla oblongata is therefore juſtly eſteemed to be a third general part of the whole maſs of the brain, or as the common production or united elongation of the whole medullary ſubſtance of the cerebrum and cerebellum.

It is extremely difficult, if not altogether impoſſible, to examine or demonſtrate it as we ought, in its natural ſituation; but we are obliged to do both on a brain inverted. However, to prevent falſe ideas either in viewing ourſelves, or in ſhewing to others, the medullary oblongata thus inverted, it is very neceſſary often to call to mind that all that appears ſuperior in that ſituation, is inferior in the natural ſtate.

The lower ſide of the medulla oblongata, in an inverted ſituation, preſents to our view ſeveral parts, which are in general either medullary productions, trunks of nerves, or trunks of blood-veſſels.

The chief medullary productions are theſe: the large or anterior branches of the medullary oblongata, which have likewiſe been named crura anteriora, femora and brachia medullæ oblongatæ, and pedunculi cerebri; the tranſverſe protuberance, called alſo proceſſus annularis or pons varolii; the ſmall or poſterior branches, called pedunculi cerebelli, or crura poſteriora medullæ oblongatæ; the extremity or cauda of the medulla oblongata, with two pairs of tubercles, one of which is named corpora olivaria, the other corpora pyramidalia: and to all theſe productions we muſt add a production of the infundibulum and two medullary papillæ.

We muſt obſerve in general concerning the eminences of the medulla oblongata, that thoſe which are medullary on their outſides or ſurfaces, are interiorly either entirely cortical, or partly cortical and partly medullary, or formed by a ſingular mixture of theſe two ſubſtances.

From this common portion of the cerebrum and cerebellum, ariſe almoſt all the nerves which go out of the cranium through the different foramina by which its baſis is perforated. It likewiſe produces the medulla ſpinalis, which is no more than a common elongation of the cerebrum and cerebellum, and of their different ſubſtances; and therefore the medulla oblongata may be juſtly ſaid to be the firſt origin or primitive of all the nerves which go out through the ſpina dorſi, and conſequently of all the nerves of the human body. See the articles MEDULLA *Spinalis*, and NERVE.

Explanation of Plate XXI.

Fig. 1. An interior view of the cerebrum and cerebellum, from Haller.

A, the tranſverſe ſeptum or tent of the cerebellum. B, the longitudinal ſinus of the dura mater, which is divided into two branches at its poſterior extremity. C, the right ſinus divided into two parts, one of which communicates with the right lateral ſinus, and the other with the left. D, veſtiges of the falx of the brain. E, E, the large veins of the ſeptum A. F, the inſertion of the veins of the cerebrum into the lateral ſinus. G, the orifice of the poſterior occipital ſinus. H, H, the poſterior occipital ſinuſes on the right and left. I, I, the falx of the cerebellum. K, K, the great tranſverſe ſinus. L, L, the jugular foſſæ. M, M, the ſinus petroſi inferior. N, N, the ſinus pretroſi ſuperior. O, O, the veins of the cerebellum which open into the above ſinuſos. P, P, the inferior occipital ſinuſes. Q, Q, the canal by which they diſcharge themſelves, and which joins the ninth pair. R, R, the anterior and ſuperior occipital ſinuſes. S, S, the communication between the ſinus cavernoſus and circularis. T, the orifice of the ſinus petroſus ſuperior, by which it communicates with the ſinus cavernoſus. V, V, ſinus cavernoſi. X, X, the tranſverſe ſinus of the pituitary foſſa. Y, Y, the circular ſinus of Ridley. Z, Z, the inſertion of the anterior veins of the cerebrum into the ſinus cavernoſi. *a*, *a*, the principal artery of the dura mater. *b*, *b*, the vein which accompanies it. *c*, the part of the cranium which it there enters by a particular foramen. *d*, *d*, the internal carotid arteries in the ſinus cavernoſus cut off at the place where they enter the cerebrum. *e*, *e*, the arterial branches ſent to the ſinus of the nerve of the fifth pair. *f*, *f*, part of the internal carotid produced to the ophthalmic artery. *g*, *g*, the poſterior apophyſes clinoides. *h*, the apophyſis, called criſta galli. *i*, *i*, the frontal ſinuſes. *k*, *k*, branches of the fifth pair, diſtributed on the dura mater. *l*, the fourth branch of the fifth pair. *m*, the ſecond branch. *n*, the firſt or ophthalmic branch. *o*, the third pair. *q*, the partition which divides the fifth and ſixth pair. *r*, the ſixth pair. *s*, origin of the intercoſtal nerve. *t*, *t*, entrance of the ſeventh pair into the dura mater. *u*, *u*, firſt inſertions of the eighth pair. *x*, *x*, ſecond inſertions of the eighth pair. *y*, *y*, the ninth pair. *z*, the foramen of the medulla ſpinalis.

In the right Eye, the ſuperior Part of the Obit taken off.

1, 1, the ophthalmic artery. 2, 2, its exterior branch, which accompanies the nerve of the ſame name. 3, 3, the interior branch diſtributed to the noſtrils. 4, 4, the ſclerotic branches, ſeveral of which are diſtributed to the uvea. 5, 5, veſtiges of the levator muſcles of the eye-lid and of the eye. 6, the extremity of the levator of the eye-lid. 7, the lacrymal gland. 8. The optic nerve. 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, the ſame as in the eye of the oppoſite ſide.

In the left Eye.

9, the annular cartilage. 10, the great oblique muſcle. 11, the levator of the eye. 12, the abductor or internal muſcle of the eye. 13. The abductor cut off. 14, the ſuperior branch of the third pair, diſtributed to the eye and eye-lid. 15, the other part of the trunk. 16, branch to the nerve to the obliquus inferior. 17, branch to the right inferior of the eye. 18, branch to the right internal. 19, branch to the ophthalmic ganglion. 20, ſuperior branch of the firſt branch of the fifth pair. 21, the exterior rope of that branch. 22, interior rope. 23, exterior branch of the firſt branch of the fifth pair. 24, ſmall branches extended to the face, through the foramina of the oſſa malarum. 25, branches to the lacrymal gland. 26, inferior branches of the ſecond branch of the fifth pair. 27, rope of that branch to the ganglion. 28, ſmall filaments to the noſtrils. 30, the ophthalmic ganglion. 31, the ſmall ciliary nerves. 7, 8, the ſame as in the right eye.

Fig. 2. From Ridley.

Exhibits the baſis of the brain, with part of the medulla oblongata, the blood veſſels being injected with wax.

A, A, the fore lobes of the brain.

B, B, the hinder lobes.

C, C, the cerebellum.

D, D, the lateral ſinuſes.

E, E, the vertebral arteries, as they paſs between the firſt vertebra and the bone of the occiput.

F, the vertebral ſinus.

G, G, G, G, G, the dura mater on the right ſide taken off from the ſpinal marrow, and remaining on the left.

1, 2, 3, 4, &c. the ten pair of nerves belonging to the brain, with ſeven of the ſpinal marrow.

a, the foramen that opens into the pituitary gland from the infundibulum.

b, *b*, the two white protuberances behind the infundibulum.

c, *c*, the two trunks of the carotid artery cut off where they began to run betwixt the fore and hinder lobes of the brain.

d, *d*, the two arteries joining the carotids, with the cervical artery called the communicant branches.

e, *e*, two large branches of the cervical artery, ſometimes ſeeming as though they came from the communicant branch on each ſide, from the firſt of which the plexus choroides hath its original in chief, and from the laſt the plexus choroides of the fourth ventricle.

f, ſeveral little branches ariſing from the carotid artery.

g, the cervical artery compoſed of the two trunks of the vertebral artery within the cranium.

h, *h*, the two trunks of the vertebral artery.

i, *i*, *i*, the ſpinal artery.

k, a ſmall branch of an artery running through the ninth pair.

l, *l*, the crura of the medulla oblongata.

m, *m*, the annular protuberance, or pons varolii.

n, that part of the caudex medullaris on the right ſide, called, by Willis and Vieuſſenius, corpora pyramidalia.

o, that part on the ſame ſide called corpus olivare.

p, the foremoſt branch of the carotid artery, dividing the fore lobes of the brain, conſiſting of two branches, one of them only appearing here.

q, *q*, little branches of arteries helping to make the plexus choroides in the fourth ventricle.

r, *r*, *r*, *r*, branches of arteries diſperſed from the cervical artery upon and through the annular protuberance.

s, *s*, part of the ſecond proceſs or pedunculi of the cerebellum.

*, *, the ſpinal acceſſory nerve.

Uſes of the Brain, *and of its Appendages in general.* — We are obliged to the great Malpighi for the firſt and beſt inſtructions concerning the manner of examining the ſtructure of the brain, eſpecially that of the two ſubſtances of which it is made up, and for putting us in a condition to be able to conjecture ſomething about its uſes. The experiments and obſervations of that illuſtrious and faithful ſearcher into nature, having been repeated by ſeveral excellent philoſophers, and confirmed by comparative anatomy, leave us no room to doubt but that the brain is a ſecretory organ, or as it is called by anatomiſts, a gland.

It is to no purpoſe to diſpute about words, when we are agreed as to the things themſelves. Anatomiſts have for many years paſt underſtood by the word gland, an organ fitted to ſeparate ſome particular fluid from the maſs of blood, as univerſally as they mean by the word muſcle, all ſorts of fleſhy fibres capable of contraction; and this laſt term might be cavilled at and rejected as juſtly as the other.

The whole matter of ſecretions muſt be owned to be very obſcure; but it is to be hoped that the brain and liver will ſome time or other lead us ſo far into the knowledge of it, as at leaſt to be able to diſtinguiſh truth from falſhood.

[illegible]ſh or aſh-colour of the cortical ſubſtance is not the effect of a particular mixture of red and white; at leaſt we have no experiment to prove it. The blood indeed gives this ſubſtance a ſlight reddiſh caſt; but the aſh-colour, which ſeems to be the characteriſtic of the ſtructure of theſe ſecretory organs, is not owing to that.

We learn from M. Ruyſch's Anatomical Injections, that the cortical ſubſtance is chiefly compoſed of veſſels; that by making theſe veſſels ſwim in a clear pellucid liquor, their extremities repreſent an infinite number of fine bruſhes or vaſcular tufts, and that his injection fills even the ſmalleſt filaments of theſe tufts. He tells us likewiſe, that in theſe laſt filaments the ſtructure is altered; and that by the mechaniſm of this change, the functions attributed to glands may be performed.

But ſtill theſe injections and preparations do not unravel the myſtery; neither is the exiſtence of theſe pencils or tufts ſufficiently demonſtrated; for they are only the laſt extremities of the ſmalleſt arteries macerated in water, or ſome other liquor, after being injected; and then artfully ſeparated from the other eſſential parts of the organ.

In the firſt place they are ſeparated from the venal extremities which muſt anſwer to theſe tufts, in what manner ſoever that be brought about. Secondly, they are ſeparated from the membraneous filaments of the pia mater, which in the natural ſtate tie theſe arterial extremities to each other, and give them a different diſpoſition from that of tufts or pencils. Thirdly, by this preparation, the arterial extremities are ſeparated from their connections with the medullary ſubſtance; which both experiments and comparative anatomy ſhew to be fibrous.

It is no ways ſurpriſing that theſe capillary extremities, thus ſtripped, ſhould float looſely and freely, when moved in a fluid; and that they ſhould put on the appearance of pencils or tufts, being in this ſtate only the truncated extremities of ſmall veſſels. When we conſider theſe circumſtances attentively, we find ourſelves obliged to return to the ſmall glandular bodies and folliculi, &c. of Malpighi, and at the ſame time we muſt acknowledge that Ruyſch's fine injections have diſcovered theſe minute bodies to be of a vaſcular ſubſtance, the ſtructure of which we are ſtill ignorant of.

In a word, Malpighi has diſcovered the glandular tubercles and folliculi, without deſtroying their natural connections. Ruyſch has diſcovered a conſiderable part of their ſtructure, by deſtroying their connections. We are therefore very much beholden to both theſe illuſtrious anatomiſts, and it is only by joining theſe obſervations to each other, that we can ever be able to form an idea of the ſecretory organs, which will anſwer all the phænomena concerning the different ſecretions in the human body.

The infinite number of theſe ſmall ſecretory cluſters, ſtrain or filter the maſs of blood carried to them by the numerous ramifications, and ſeparate from it an exceſſively fine fluid; the remaining blood being conveyed back by the ſame number of venal extremities into the ſinuſes of the dura mater, and from thence into the jugular and vertebral veins.

This ſubtle fluid, commonly called animal ſpirit, nervous juice, or liquor of the nerves, is continually forced into the medullary fibres of the white portion of the cerebrum, cerebellum, medulla oblongata, and medulla ſpinalis; and by the intervention of theſe fibres ſupplies and fills the nerves, which are a continuation of them.

All the nervous ropes, as they paſs through the foramina of the cranium and vertebræ, are accompanied by particular elongations of the pia and dura mater. Thoſe of the dura mater ſerve them for vaginæ in their paſſage through the bony openings. Thoſe of the pia mater not only accompany and inveſt each nervous rope, but alſo form internal ſepta, between all the filaments of which each rope conſiſts. It is known from many experiments, that the nerves are the primitive or original organs of all muſcular motion, and of all animal ſenſation; and that theſe two functions depend in general on the brain; but we are ignorant of the nature of this dependance, and of the particular uſes of the medullary fibres, of the nervous fluid, and of the membraneous productions which accompany the fibres and nerves.

Neither is there any thing certain in what has been ſaid concerning the deſign or particular uſes of the ſuperficial conformation of the cerebrum and cerebellum, or of the different configuration of their turnings, circumvolutions, eminences, depreſſions, expanſions, and various folds. It may be affirmed in general, that by this ſtructure the extent of the ſecretory organ of the nervous fluid is increaſed very conſiderably, and the particular functions of each nervous rope diſtinguiſhed, and likewiſe their general and reciprocal correſpondence, both in regard to the exquiſiteneſs of the organs of ſenſation, and the activity of the organs of motion.

The falx of the dura mater hinders one portion of the cerebrum from preſſing on the other, when we lie on one ſide. The tranſverſe ſeptum ſerves for a tent to the cerebellum, and defends it from a mortal compreſſion, which it muſt otherwiſe be liable to from the cerebrum, eſpecially when we walk or jump.

The ſeptum and productions of the pia mater connect and ſtrengthen all the circumvolutions, diviſions, and ridges of the cerebrum, cerebellum, &c. and ſuſtain in a general and almoſt incomprehenſible manner all the branches and ramifications of the blood veſſels, all the medullary filaments, and all the elongations and ropes that depend on theſe. *Winſlow's Anatomy.*

BRAMBLE, or **Bramble-Bush**, in botany, the Engliſh name of the rubus of authors. See the article Rubus.

Bramble-Net, otherwiſe called hallier, is a net to catch birds in, of ſeveral ſizes; the great meſhes muſt be four inches ſquare; thoſe of the leaſt ſize are three or four inches ſquare; and thoſe of the biggeſt five. In the depth, they ſhould not be above three or four inches; but as for the length, they may be enlarged at pleaſure; the ſhorteſt being eighteen feet long.

BRAMINS, the name of the prieſts among the idolatrous Indians, the ſucceſſors of the ancient Brachmans. See the article Brachmans.

BRAN, the ſkins or huſks of corn, eſpecially wheat ground, ſeparated from the flour by a ſieve or boulter.

It is of wheat-bran that ſtarch-makers make their ſtarch. The dyers reckon bran among the not-colouring drugs, and uſe it for making, what they call, the four waters, with which they prepare their ſeveral dyes.

Bran, being of a porous ſpongy ſubſtance, is uſed, in pharmacy, as a ſuppurative and digeſtive medicine. In the compoſition of a cataplaſm, the warmth of the part it is applied to, ſo rarefies the bran, that being kept from the external air, all that can tranſpire will be ſucked up into its interſtices. However, it ſhould be applied where there is good probability of the matter's tranſpiring; otherwiſe it will draw more to the part, and thereby increaſe the malady.

BRANCH, in botany, an arm of a tree, or a part which ſprouting out from the trunk, helps to form the head or crown thereof.

As branches have their outward parts common with the chief ſtem, ſo in like manner do their inward conſiſt of a multitude of tubes, which are alſo provided with a number of ſmall glands, veins, and muſcles, interſperſed here and there, where the ſap coming from the firſt canal is rendered much more delicate.

Branches are diſtinguiſhed into various kinds: 1. Wood-branches, which are thoſe that form the ſhape of the tree, and are to be pruned from four to twelve inches, according to the vigour of the tree. 2. Fruit-branches, which are ſlenderer than the wood-branches, and have their eyes near to one another and large, by which the fruit-buds are formed. If they are too long, they are to be topped; but if they are of a juſt length, they are to be preſerved, only juſt cutting off the extremity. 3. Branch-half-wood, that which, being too ſlender for a wood-branch, and too big for a fruit-branch, is cut off at the length of two or three inches, to make it produce a better ſhoot, whether wood or fruit. 4. Irregular branches, which are ſmall and confuſed: they muſt be cut off, becauſe they are neither fit for wood nor fruit. 5. Branches of falſe wood: theſe are ſuch as grow upon the true wood-branches, and have flat eyes at a diſtance one from another; for which reaſon they are uſeleſs, and therefore muſt be cut off. 6. Luxuriant branches, which are ſuch as ſhoot out from the large wood-branches: theſe are as taper and as big about as one's finger, the back being ſmooth and even, and having broad eyes at a diſtance from one another: theſe muſt all be cut off. 7. Spurious wood-branches, ſuch as come contrary to the order of nature, or otherwiſe than from the cuts of the preceding year; or which, coming on ſuch cuts, are big in the place where they ſhould be ſmall.

The diſtinguiſhing marks of good branches are, that the eyes, in the whole extent, be thick, well fed, and very cloſe one to another. The good ſtrong branches are employed in producing yearly, on their extremities, other new branches, ſome ſtrong and others weak. The good weak branches are, ſuch as are well placed, and being of a mean thickneſs and length, may be able to produce, ſpeedily, beautiful and good fruit.

The diſtinguiſhing marks of bad branches are, when in the lower part the eyes are flat, ill fed, and hardly formed, and at a large diſtance one from another.

Branch is likewiſe a term uſed in genealogy and anatomy. Thus we ſay, the branch of a family, the branch of an artery, the branch of a vein.

Branches *of a Bridle*, in the menage, are two pieces of iron bended, which in the interval, between the one and the other, bear the bit-mouth, the croſs-chains, and the curb; ſo that on one end they anſwer to the headſtall, and on the other to the reins, in order to keep the horſe's head in ſubjection. With regard to their form and ſtructure, branches are either ſtraight, in form of a piſtol, for young horſes to form their mouth, or, after the conſtable of France's faſhion, proper for a horſe that carries his head well. Some are in form of a gigot or leg, which will prevent horſes from carrying too low: ſome in form of a bent-knee, contrived for horſes that arm themſelves againſt the operation of the bit; and others, after the French faſhion, which is hardly about $\frac{1}{5}$ of an inch at the ſevil hole, and kneed $1\frac{1}{4}$ inch at the jarret or ham.

It is to be obſerved, 1. That the farther the branch is from an horſe's neck, the more effect it will have. 2. That ſhort branches *cæteris paribus* are ruder, and their effects more ſudden than thoſe of longer. 3. That the branch is to be proportioned to the length of a horſe's neck; and one may ſooner err in chooſing one too ſhort than too long.

Branches *of Ogives*, in architecture, are the arches of Gothic vaults. Theſe arches traverſing from one angle to another diagonal wiſe, form a croſs between the other arches, which make the ſides of the ſquare, of which the arches are diagonals.

Branch *of a Trench.* See Boyau.

Branch *of a Mine.* See Gallery.

Branch-Stand, with falconers, a term uſed to ſignify the making a hawk leap from tree to tree, till the dog ſprings the game.

BRANCHER, among ſportſmen, a young hawk, newly taken out of the neſt, that can hop from bough to bough.

BRANCHERY, in the anatomy of plants, denotes the ramifications of the ſucciferous veſſels diſperſed thro' the parenchyma, or pulpy parts of fruits.

The main branches are uſually twenty in number; one half, or fifteen, being diſtributed over the parenchyma, and the reſt, running from the ſtalk in a ſtraight line, meet the former at the cork or ſhoot of the flower: to theſe laſt the coats of the kernels are faſtened.

BRANCHIÆ, **Gills**, in the anatomy of fiſhes, the parts correſponding to the lungs of land-animals, by which fiſhes take in and throw out again a certain quantity of water, impregnated with air. All fiſhes, except the cetaceous ones and the petromyzum, are furniſhed with theſe organs of reſpiration; which are always eight in number, four on each ſide the throat; that next the heart is always the leaſt, the reſt increaſing in order as they ſtand near the head of the fiſh.

Each of theſe gills is compoſed of a bony lamina, in form of a ſemicircle, for the moſt part; and on its convex ſide ſtand the leaves or lamellæ, like ſo many ſickles. The whole convex part of the lamellæ is beſet with hairs, which are longeſt near the baſe, and decreaſe gradually as they approach towards the point. There are alſo hairs on the concave ſide of the lamellæ, but ſhorter than the others, and continued only to its middle.

The convex ſide of one lamina is fitted into the concave ſide of the next ſuperior one; and all of them are connected together by means of a membrane, which reaches from their baſe half way their height, where it grows thicker, and in ſome meaſure reſembles a rope. The reſt of the lamina is free, and terminates in a very fine and flexible point.

As to the uſe of theſe gills, they ſeem to be deſigned to receive the blood protruded from the heart into the aorta, and convey it into the extremities of the lamellæ; from whence being returned by veins, it is diſtributed over the body of the fiſh.

BRANCHIARUM Foramina, *Apertures of the Gills.* In moſt fiſhes there is only one aperture; in the cartilaginous ones, theſe apertures are ten in number, five on each ſide; and in the petromyzon or lamprey, there are no leſs than fourteen of theſe apertures, ſeven on each ſide.

As to the cetaceous fiſhes, they have no aperture of this kind; and the reaſon ſeems to be, becauſe they are furniſhed with lungs.

BRANCHIDÆ, in Grecian antiquity, prieſts of the temple of Apollo, which was at Didymus in Ionia, a province of Leſſer Aſia, towards the Ægean ſea, upon the frontiers of Caria. They opened to Xerxes the temple of Apollo, the riches whereof he took away: after which, thinking it unſafe to ſtay in Greece, they fled to Sagdiana, on the other ſide of the Caſpian ſea, upon the frontiers of Perſia, where they built a city, called by their own name: but they did not eſcape the puniſhment of their crime; for Alexander the Great, having conquered Darius, king of Perſia, and being informed of their treachery, put them all to the ſword, and razed their city; thus puniſhing the impiety of the fathers in the poſterity.

BRANDY, a ſpirituous and inflammable liquor, extracted from wine and other liquors by diſtillation, which is moſt generally performed by the common alembic; but ſometimes alſo in balneum mariæ. See Distillation.

The veſſels uſed in this operation are commonly of copper; ſome diſtillers, in order to cool the brandy, make the neck of the matraſs very long, and of a ſerpentine or winding figure, in order to its paſſing through a tub of cold water.

In order to diſtil brandy, they fill the cucurbit half full with the liquor they would extract it from, which they put over a moderate fire, till about the ſixth part of it be diſtilled, or till they perceive that what falls into the recipient, is no longer inflammable. Brandy diſtilled a ſecond time is called ſpirit of wine; and this ſpirit, purified again by one or by ſeveral diſtillations, is what they call ſpirit of wine rectified. The ſecond diſtillation is made in the balneum mariæ, and in a glaſs cucurbit, till the brandy that was put into it be reduced into one half, and this half is again rectified, as often as the operator thinks proper. To try the goodneſs of the rectified ſpirit of wine, you muſt examine whether, when lighted into a blaze, it conſumes entirely, without leaving any impurity behind: or rather, which is ſurer ſtill, whether, having put ſome gunpowder at the bottom of the ſpirit you would try, the powder takes fire, when the ſpirit is conſumed; in which caſe the ſpirit is good. With regard to brandy (we ſpeak only of that which is diſtilled from wine), they who trade in it, chooſe it white, clear, of a good taſte, and ſuch as will bear the teſt or proof; that is to ſay, that when poured into a glaſs it forms on the top of it a little white lather, which, as it diminiſhes, makes a circle; there being no brandy but that which is well deflegmated, and does not retain too much humidity, wherein this bead-proof, as it is called, will be entirely formed.

The chief uſe of brandy is as a drink, particularly in the northern countries, among the negroes of Guinea, who will ſell one another for ſome bottles of brandy, and among the ſavages of Canada, who are extremely fond of it. Brandy is alſo uſed in medicine, to ſtrengthen the nerves; and in dying, rectified ſpirits of wine being reckoned by the dyers among the non-colouring drugs.

Method of colouring Brandy. All brandies, when firſt made, are as clear as water, and grow higher coloured by long keeping; however, they are artfully made of any colour ſeveral ways. To make a light ſtraw-colour, uſe turmeric, or a little treacle: but the beſt way is to give it a colour or tincture with a little burnt ſugar, made to a conſiſtence; or ſyrup of elder-berries may be uſed, which gives an admirable colour, and may be made deeper or lighter, according to the quantity you put in.

Beſides the brandy made of wine, there is ſome alſo made of beer, cyder, ſyrups, ſugar, molaſſes, fruit, grain, &c. however, theſe are not properly called brandy; but go under the general denomination of ſpirits. See the articles Rum, Arrack, &c.

Wine brandy made in France, is eſteemed the beſt in Europe. They make it wherever they make wine; and for that purpoſe, uſe wine that is pricked, rather than good wine. The chief brandies for foreign trade, and thoſe accounted beſt, are the brandies of Bourdeaux, Rochelle, Cogniac, Charenton, the iſle of Rhe, Orleans, the country of Blaſois, Poictou, Touraine, Anjou, Nantes, Burgundy, and Champaign.

BRASIDIA, an anniverſary ſolemnity at Sparta, in memory of Braſidas, a Lacedæmonian captain, famous for his atchievements at Methone, Pylos, and Amphipolis. It was celebrated with ſacrifices and games, wherein none were permitted to contend, but free-born Spartans. Whoever neglected to be preſent at the ſolemnity, was fined.

BRASIL, or Brazil, a large maritime country of South America, lying between 35°. and 60°. Weſt longitude, and between the equator and 35°. South latitude.

It is bounded by the Atlantic ocean and the river Amazon on the north, by the ſame ocean on the eaſt, by the river of Plate on the ſouth, and by Paraguay on the weſt; being computed to be 2500 miles in length, and 700 miles in breadth.

The Portugueſe have now the ſole dominion of this extenſive country, where, beſides ſugar and tobacco, there are rich mines of gold and diamonds; from whence his Portugueſe majeſty draws a very conſiderable revenue.

Brasil, or Brazil, in natural hiſtory, is a red wood, brought from the province of that name in South-America. There are different ſorts of it, diſtinguiſhed by the names of Fernambouc, St. Martha, &c. What differences there are in the trees we know not: the woods, brought to us, differ little otherwiſe than as different parts of one log, ſome pieces being richer in colour than others.

This wood is called, by Caſpar Bauhipe, baſtard redſaunders, *Pſeudoſant alum rubrum ſive arbor Brazilia.* Many have confounded it with the true red-ſaunders: the college of Bruſſels, in their account of that wood, have plainly miſtaken the Brazil for it: however the two trees may be allied in their botanic characters, the woods, chemically conſidered, are very obviouſly different; Brazil wood readily giving out its red colour to water, whilſt ſaunders gives no red tinge to any aqueous liquor. The watery tincture of Brazil, however, is not quite ſo deep as that made in rectified ſpirit of wine, or in volatile alkaline ſpirits.

The ſpirituous tincture ſtains warm marble of a purpliſh red, which, upon increaſing the heat, becomes violet. Mr. du Fay informs us, in a paper upon this ſubject in the French Memoirs, that if the ſtained marble be covered with wax, and conſiderably heated, it changes thro' all the ſhades of brown, and fixes at laſt in a chocolate colour.

The colour of the watery decoction is heightened by alum, and inclined to a crimſon. A decoction made with alum, in the proportion of about one part of the ſalt to four of the wood, yields upon adding alkaline ley or volatile ſpirits, a kind of crimſon lake verging a little to violet.

Solution of tin in aqua-fortis, added to the decoction, throws down a much finer coloured precipitate, little inferior in beauty to carmine. This experiment, firſt communicated in the *Acta naturæ curioſorum*, has been ſeveral times repeated with ſucceſs. The quantity of lake is largeſt when alum is uſed in making the decoction; but the colour is much finer without it.

A tranſparent crimſon for water-colours is ſaid to be made by boiling the wood in ſmall wort, with a little tartar. A large proportion of tartar weakens the colour. All acids, if their quantity is conſiderable, have this effect: thoſe of the mineral kingdom totally deſtroy it.

Brazil wood dyes woollen of a red colour, which does not want beauty, but has little durability. Mr. Hellot gives a pretty remarkable proceſs, by which both the beauty and permanency of the dye are improved. He directs the wood, cut in ſmall pieces, to be boiled in two freſh parcels of the hardeſt well-water that can be procured; the decoctions to be mixed together, and kept in a caſk, till they ferment, grow ſtale, and appear ropy like an unctuous wine. The cloth is to be boiled for three hours with alum and tartar, in the proportion of ſix or eight ounces of the former, and two or leſs of the latter, to every pound, and afterwards kept moiſt, in a cool place, for eight or ten days, that it may be thoroughly penetrated by the ſalts. A quantity of the ſtale decoction of Brazil is made to boil in a copper, and ſome common coarſe ſtuff, prepared as uſual with alum and tartar, dyed in it: half as much more of the liquor is then added, and another piece of cloth dyed; ſo as that, between the two, about three fourths of the colour may be taken up. The cloth prepared as above is now to be dipped, and the liquor kept gently boiling, till it has taken the colour uniformly. The red, obtained by this proceſs, is a lively and durable demi-ſcarlet: on expoſure to the air for four months, in winter, it loſt nothing; but on the contrary became deeper, and ſeemed to gain a body.

The ſame author gives another method of fixing the colour of Brazil by aſtringents: the dyes thus produced are not red, but coffees and purple-cheſnuts, very beautiful and gloſſy: for this purpoſe he dilutes the ſtale decoction of Brazil with twice its quantity of water; and adds for every pound of cloth, about an ounce of powdered galls, and half an ounce of gum arabic. The cloth, prepared with alum and tartar, and kept moiſt for fifteen days, is boiled in this liquor for an hour or two, according as the colour is wanted lighter or deeper, and ſuffered to grow thoroughly cold before it is waſhed.

BRASS, or, as the French call it, Yellow-Copper, is a factitious metal, made of copper and lapis calaminaris.

The method of preparing it is as follows: The lapis, having been calcined and ground fine as flour, is mixed with fine charcoal, and incorporated, by means of water, into a maſs: this being done, about ſeven pounds of lapis calaminaris is put into a melting pot that will contain about a gallon, and over that about five pounds of copper; this pot is let down into a wind furnace, where it remains for eleven hours, in which time it is converted into braſs. The metal then is caſt, either into plates or lumps; forty-five pounds of crude lapis calaminaris will produce thirty pounds when calcined or burned. Sometimes braſs-ſhruff is uſed inſtead of copper; but that is not always to be procured in quantities ſufficient, it being no other than a collection of old braſs.

Pure braſs is not malleable, unleſs when it is hot; for when it is cold it will break; and after it has been melted twice, it will be no longer in a condition to bear the hammer at all: but in order to render it capable of being wrought, they put ſeven pounds of lead to an hundred weight of braſs, which renders it more ſoft and pliable.

The beſt proportion for braſs-guns is ſaid to be a thouſand pounds of copper, nine hundred pounds of tin, and ſix hundred pounds of braſs, in eleven or twelve thouſand weight of metal.

The beſt braſs guns are made of malleable metal, not of pure copper and calamine alone; but worſer metals are uſed to make it run cloſer and ſounder, as lead and pot-metal. See Cannon.

Braſs may be cleanſed, firſt, by rubbing it with a cloth dipped in equal quantities of aqua-fortis and common water; then with an oily cloth, and laſtly with a dry one dipped in lapis calaminaris.

Braſs is tinged of a gold colour, firſt, by burning, then diſſolving it in aqua-fortis, and, laſtly, reducing it to its metalline ſtate. It may be whitened by heating it red-hot, and quenching it in water diſtilled from ſal ammoniac and egg-ſhells. It is ſilvered, or coloured ſuperficially white, by rubbing it with balls made of ſilver diſſolved in aqua-fortis, with powder of white tartar, ſufficient to abſorb all the moſture thereof.

Corinthian Brass has been famous in antiquity, and is a mixture of gold, ſilver, and copper. L. Mummius having ſacked and burned the city of Corinth, 146 years before Chriſt, it is ſaid this metal was formed from the immenſe quantities of gold, ſilver, and copper, wherewith that city abounded, thus melted and run together by the violence of the conflagration.

Brass-Colour, one prepared by the braziers and colourmen to imitate braſs. There are two ſorts of it, the red braſs, or bronze, and the yellow or gilt braſs; the latter is made only of copper-filings, the ſmalleſt and brighteſt that can be found; with the former they mix ſome red ochre, finely pulverized: they are both uſed with varniſh.

BRASSICA, Cabbage, in botany, a genus of the tetradynamia-ſiliquoſa claſs of plants; the flower of which is cruciform, conſiſting of four petals, almoſt of the ſame length with the cup. The fruit is a bivalve pod, containing globoſe ſeeds. See the article Cabbage.

BRASSICAVIT, or Brachicavit, in the menage, is a horſe whoſe fore legs are naturally bended archwiſe: being ſo called by way of diſtinction from an arched horſe, whoſe legs are bowed by hard labour.

BRAULS, Indian cloths with blue and white ſtripes. They are otherwiſe called turbans, becauſe they ſerve to cover thoſe ornaments of the head, particularly on the coaſt of Africa.

BRAURONIA, in Grecian antiquity, a feſtival in honour of Diana, ſurnamed Brauronia, from its having been obſerved at Brauron, an Athenian borough.

This feſtival was celebrated once in five years, being managed by ten men, called *ιεροποιοι*. The victim offered in ſacrifice was a goat, and it was cuſtomary for certain men to ſing one of Homer's Iliads. The moſt remarkable perſons at this ſolemnity were young virgins, habited in yellow gowns, and conſecrated to Diana. It was unlawful for any of them to be above ten, or under five years of age.

BRAWN, the fleſh of a boar ſouſed or pickled; for which end the boar ſhould be old, becauſe the older he is, the more horny will the brawn be.

The method of preparing brawn is as follows: the boar being killed, it is the flitches only, without the legs, that are made brawn; the bones of which are to be taken out, and then the fleſh ſprinkled with ſalt, and laid in a tray, that the blood may drain off: then it is to be ſalted a little, and rolled up as hard as poſſible. The length of the collar of brawn ſhould be as much as one ſide of the boar will bear; ſo that when rolled up, it will be nine or ten inches diameter.

The collar being thus rolled up, is to be boiled in a copper, or large kettle, till it is ſo tender that you can run a ſtraw through it: then ſet it by, till it is thorough cold, and put it into the following pickle. To every gallon of water, put a handful or two of ſalt, and as much wheat bran: boil them together, then drain the bran as clear as you can from the liquor; and when the liquor is quite cold, put the brawn into it.

BRAZIER, an artificer who makes and ſells copper and braſs veſſels.

Explanation of Plate XXII.

The upper compartment of the plate repreſents a brazier's ſhop, with the workmen performing the various operations belonging to that trade.

Fig. 1. The workman forming the upper rim or border of a copper veſſel.

2. The operation of turning a veſſel, or rendering it truly circular.

3. The perſon who turns the wheel.

4. The manner of performing the operation of tinning a copper veſſel. *f*, the furnace, or large chaffin-diſh, which holds the fire. *g*, the copper veſſel to be tinned.

5. An anvil with a round or globular face, on which they hammer the bottoms of copper veſſels.

6. The manner of hammering the inſide of the bottom, upon a kind of anvil, which they call a ſtamp.

7. Manner of piercing a large copper with holes, for rivetting the ſeveral pieces together. *a*, the copper, or caldron. *b*, the pieces of which the copper is compoſed, pierced with holes, for rivetting them together.

7. N. 2. The manner of hammering the outſide of a copper or braſs veſſel, upon what they call a horſe. *c*, the horſe on which the veſſel is ſupported.

8. The perſon holding an iron tube in order to receive the top of the punch.

Lower Compartment of the Plate.

Fig. 9. A ſort of anvil called a bicorn, with two arms.

10. Another ſort of bicorn for making coffee-pots and other veſſels of that kind.

11. Another bicorn, with one arm only.

12. A bicorn, flat at the extremity of the arm. *a*, a hole for holding a ſmall anvil, having a round gutter or concave canal running through it, for forming the rim or border of veſſels.

16. *b*, the ſmall anvil above deſcribed.

13. A ſmall anvil with a flat face.

14. A hammer with a flat face, and ſharp at the claw.

15. Bottom of a kettle that is to be compoſed of two pieces.

19. Body or ſides of the ſame kettle.

17, 18. Buttreſſes.

20. A circular piece of copper uſed in making ſeveral ſorts of veſſels, as ſauce-pans, &c.

21. A ſauce-pan, with a handle, formed out of ſuch a piece of copper.

22. A flat pudding pan.

23. Another pan with a cover.

24. The horſe mentioned before in deſcribing the upper compartment.

25. A copper ſkimmer.

26, 27. Two ſmall anvils, one round and the other oval.

a, The oval anvil. *b*, the round anvil.

BRAZING, the ſoldering or joining two pieces of iron together, by means of thin plates of braſs, melted between the pieces that are to be joined. If the work be very fine, as when two leaves of a broken ſaw are to be brazed together, they cover it with pulverized borax, melted with water, that it may incorporate with the braſs powder, which is added to it: the piece is then expoſed to the fire without touching the coals, and heated till the braſs is ſeen to run.

Brazing is alſo the joining two pieces of iron together by heating them hot, the one upon the other, which is uſed for large pieces by farriers, &c.

BREACH, in fortification, a gap made in any part of the works of a town by the cannon or mines of the beſiegers, in order to make an attack upon the place. See plate XXIII. *fig.* 10. which repreſents a breach made by the exploſion of a mine.

A practical breach is that where men may mount, and make a lodgment, and ought to be fifteen or twenty feet wide.

Breach, in a legal ſenſe, is where a perſon breaks through the conditions of a bond or covenant, on an action upon which the breach muſt be aſſigned: nor muſt the aſſignment be general; it muſt be particular; as in an action of covenant for repairing houſes, it ought to be aſſigned particularly what the want of reparation really is; and in ſuch certain manner that the defendant may take an iſſue.

BREAD, *Panis*, a maſs of dough kneaded and baked in an oven.

We find bread ſometimes made of rye, of oats, and of barley; but that prepared from wheat is by far the moſt wholeſome. In ſeveral parts of Aſia, Africa, and America, they make bread of maize, or Indian corn; and in ſome parts the Americans make bread of the caſſava root. See Cassava.

BREADTH, in geometry, one of the three dimenſions of bodies, and which, multiplied into the length, produces a ſurface.

BREAKERS, a name given by ſeamen to the waves that break over rocks or ſhallows lying immediately under the ſurface of the water. If a ſhip is driven among breakers, it is almoſt impoſſible to ſave her from being wrecked, as every billow lifts her up and daſhes her bottom with additional force upon the rocks or ſands.

BREAKING-BULK, in naval affairs, beginning to unload the cargo.

BREAK-WATER, the hull of ſome old ſhip or veſſel ſunk at the entrance of a ſmall harbour, to break off the ſea.

BREAM, *Brama*, in ichthyology, the name of a fiſh, of which there are two ſorts, one found in the freſh, and the other in the ſalt water. The former is the cyprinus, and has all its fins black; and the latter the reddiſh ſparus, having eleven parallel and gold coloured lines on each ſide.

BREAMING, in naval affairs, the burning the graſs, ooze, or ſhells, from off a ſhip's bottom, with furze or faggots. See Careen and Dock.

BREAST, *Pectus*, in anatomy, the fore-part of the thorax. See Thorax.

Breasts, *Mammæ*, in anatomy; ſee the article Mammæ.

Breast-Hooks, in naval architecture, ſtrong pieces of crooked timber bolted acroſs the ſtem, and fayed to the inſide of a ſhip's bows, to fortify the fore-part. See Bow.

Breast-Plate, in antiquity, a piece of armour worn to defend the breaſt, originally believed to be made of hides, or hemp twiſted into ſmall cords; but afterwards made of braſs, iron, or other metals, which were ſometimes ſo exquiſitely hardened, as to be proof againſt the greateſt force.

Breast-Plate, in the menage, the ſtrap of leather that runs from one ſide of the ſaddle to the other, over the horſe's breaſt, in order to keep the ſaddle tight, and hinder it from ſliding backwards.

Breast-Plough, one ſo faſhioned that a man may ſhove it before him.

Breast-Work, the ſame with parapet. See the article Parapet.

BREECH *of a great Gun*, or *Cannon*, the end next the touch-hole.

BREECHING, in ſea-gunnery, a rope whoſe middle part being faſtened to the breech or pomellion of a piece of ordnance, the two ends are paſſed through ring-bolts on each ſide of the carriage, and afterwards faſtened to other ring-bolts in the ſhip's ſide. It is uſed to ſecure the cannon in time of engagement, and prevent them from recoiling too much. Pomellion is the ſame thing amongſt ſeamen, that caſcabel is with engineers, the hindmoſt knob on the breech of a cannon.

BREEZE, a ſhifting wind that blows from ſea or land for ſome certain hours in the day or night; common in Africa, and ſome parts of the Eaſt and Weſt Indies.

The ſea breeze is only ſenſible near the coaſts; it commonly riſes in the morning, about nine, proceeding ſlowly in a fine ſmall black curl on the water, towards the ſhore; it increaſes gradually till twelve, and dies about five. Upon its ceaſing, the land-breeze commences, which increaſes till twelve at night, and is ſucceeded in the morning by the ſea-breeze again.

Breeze, in brick-making, ſmall aſhes and cinders, ſometimes made uſe of inſtead of coals, for the burning of bricks: but as this does not ſo well anſwer the end, the uſe of it is prohibited by 12 Geo. I. cap. xxxv.

BREGMA, in anatomy, the ſame with ſinciput. See Sinciput.

The bregma conſiſts of two bones, which are bones of the cranium, called oſſa parietalia.

BRENT-GOOSE, a ſpecies of gooſe with a black neck and a white collar round; uſually confounded with the barnacle, though in reality a diſtinct ſpecies.

It is a little larger than the common duck, and is deſcribed by authors under the name of *anas torquata*.

BRESICATE, in commerce, a kind of bays, of which there is ſome trade carried on with the negroes, between the

Barruly.

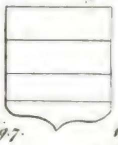


Fig. 7.

Barry Bendy

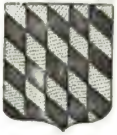


Fig. 8.

Barometer.

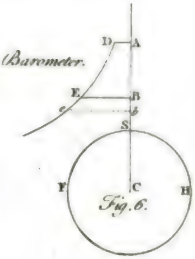

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Fig. 6.

Barometer

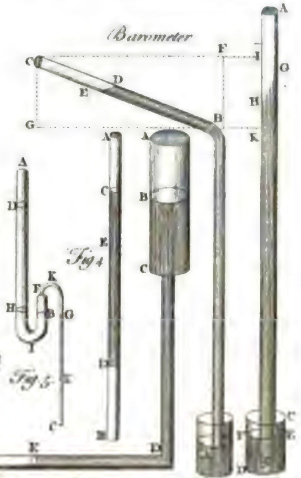
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Fig. 5. *Fig. 4.* *Fig. 3.* *Fig. 2.* *Fig. 1.*

Bimedial *Fig. 9.*

Breach

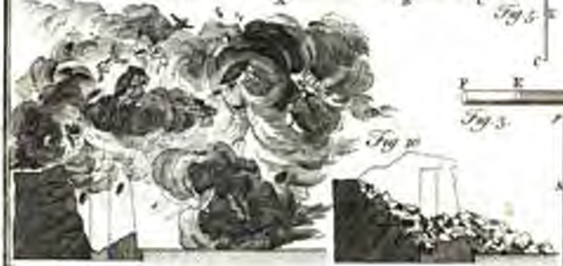


Fig. 10.

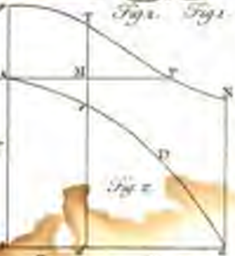
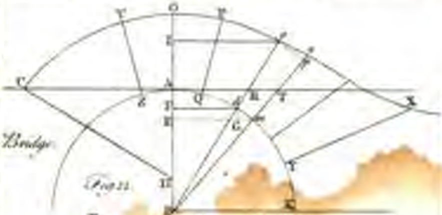


Fig. 12.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Bridge. *Fig. 11.*

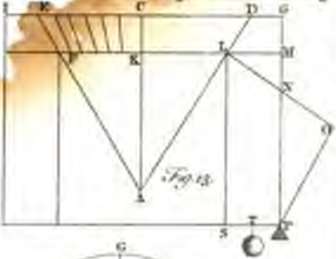
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Fig. 13.

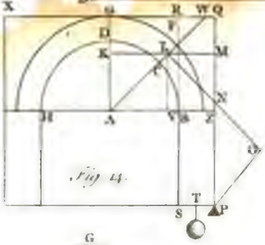
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Fig. 14.

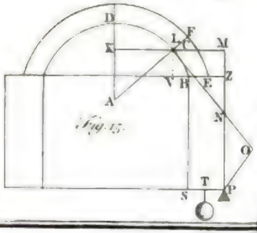
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Fig. 15.

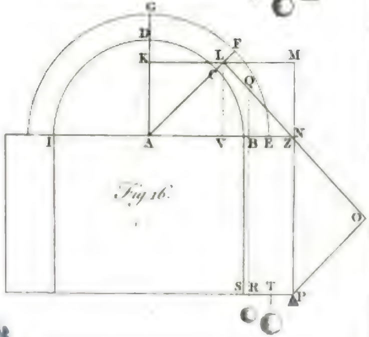
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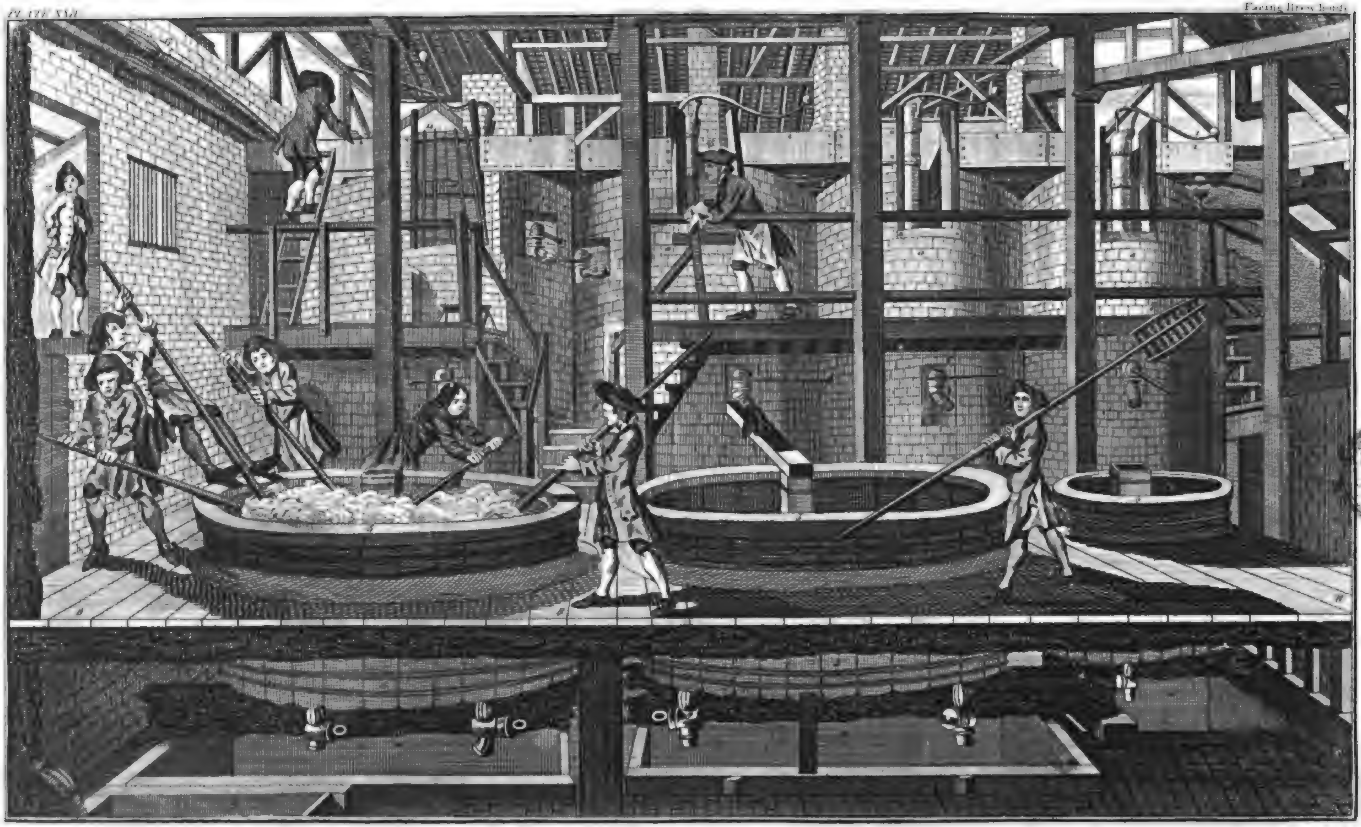
Fig. 16.

PLATE XVII

Facing Brewhouse



the river Gambia and Sierra Leone. The beſt ſorts for that purpoſe are the blue and the red.

BREST, or **Breast**, in architecture, a term ſometimes uſed for the member of a column, more uſually called torus. See the article Torus.

Brest-Summers, in timber buildings, are pieces in the outward parts thereof, into which the girders are framed: this in the ground floor is called a cill; and in the garret-floor a beam.

As to their ſize it is the ſame with that of girders. See the article Girders.

BREVE, in law, is any writ directed to the chancellor, judges, ſheriffs, or other officers, whereby a perſon is ſummoned, or attached, to anſwer in the king's courts, &c.

Breve Perquirere, the purchaſing of a writ or licence for trial in the king's courts: whence comes the preſent uſage of paying ſix ſhillings and eight-pence fine to the king in ſuit, for money due on bond, where the debt is forty pounds, and of ten ſhillings where it is a hundred pounds, &c.

Breve De Recto is a writ of right, or licence, for a perſon ejected to ſue for the poſſeſſion of the eſtate detained from him.

Breve, in muſic, a note or character of time, in the form of a diamond, or ſquare, without any tail, and equivalent to two meaſures, or ſemibreves.

Breve, or **Brevis**, in grammar: ſyllables are diſtinguiſhed into longs and breves, according as they are pronounced quicker or more ſlow.

BREVET, in the French cuſtoms, denotes the grant of ſome favour or donation from the king, in which ſenſe it partly anſwers to our warrant, and partly to letters patent.

BREVIARY, a daily office, or book of divine ſervice, in the Romiſh church. It is compoſed of matins, lauds, firſt, third, ſixth, and ninth veſpers, and the compline, or poſt communio.

The breviary of Rome is general, and may be uſed in all places; but on the model of this various others have been built, appropriated to each dioceſe, and each order of religious.

The breviary of the Greeks is the ſame in almoſt all the churches and monaſteries that follow the Greek rites: the Greeks divide the pſalter into twenty parts. In general, the Greek breviary conſiſts of two parts, the one containing the office for the evening, the other that of the morning, divided into matins, lauds, firſt, third, ſixth, and ninth veſpers, and the compline; that is, of ſeven different hours, on account of that ſaying of David, *Septies in die laudem dixi tibi.*

The inſtitution of the breviary is not very ancient: there have been inſerted in it the lives of the ſaints, full of ridiculous and ill atteſted ſtories, which gave occaſion to ſeveral reformations of it, by ſeveral councils, particularly thoſe of Trent and Cologn; by ſeveral popes, particularly Pius V. Clement VIII. and Urban VIII. alſo by ſeveral cardinals and biſhops, each lopping off ſome extravagances, and bringing it nearer to the ſimplicity of the primitive offices.

BREVIBUS a Rotulis Liberandis, a writ or command to a ſheriff, to deliver to his ſucceſſor, the county, with the appurtenances, and the rolls, writs, and other things to his office belonging.

BREVIER, among printers, a ſmall kind of type, or letter, between nonpareil and bourgeois.

BREVIS, in anatomy, an appellation given to ſeveral muſcles, on account of their ſhortneſs. Thus,

Brevis Cubiti, in anatomy, is a muſcle that riſes from the ſuperior and poſterior part of the humerus, and by joning its fleſhy fibres with the brachiæus externus and longus, and becoming tendinous, covers the elbow, and is inſerted into the olecranium, to extend the arm.

Brevis Radii, a muſcle which comes from the external and upper part of the ulna, and paſſing round the radius, is inſerted into its upper and fore-part, below the tendon of the biceps: this and the longus radii are called the ſupinators, their office being to turn the palm upwards.

Brevis Palmaris lies under the aponeuroſis of the palmaris, and ariſes from the bone of the metacarpus, that ſuſtains the little finger, and from that bone of the carpus which lies above the reſt: it goes tranſverſly, and is inſerted into the eighth bone of the carpus: it aſſiſts in making the palm of the hand concave.

BREVITY, in matters of ſtile, is a perfection of diſcourſe, whereby all ſuperfluous words are rejected, and only ſuch as are abſolutely neceſſary uſed. However, as brevity is apt to degenerate into obſcurity, it is a leſs fault to ſay too much than too little.

BREW-HOUSE, a building adapted to the brewing, &c. of malt liquors.

In order to erect a large or public brew-houſe to the beſt advantage, ſeveral circumſtances ſhould be carefully obſerved. 1. That three ſides in four of the upper-part, or ſecond floor, be built with wooden battons about three inches broad, and two thick, that a ſufficient quantity of air may be admitted to the backs or coolers. 2. That the coppers be erected of a proper height above the maſhing-ſtage, that the hot water may be conveyed by means of cocks into the maſh-tuns, and the worts into the coolers. 3. That the fire-places of the coppers be very near each other, that one ſtoker, or perſon who looks after the fire, may attend all. 4. That the yard for coals be as near as poſſible to the fire-places of the copper. 5. That the malt be ground near the maſh-tuns, and the mill erected high enough that the malt may be conveyed from the mill immediately into the maſh tuns, by means of a ſquare wooden ſpout or gutter. 6. That the upper backs be not erected above thirty-tree feet above the reſervoir of water, that being the greateſt height water can be raiſed by means of a common ſingle pump. 7. That the pumps which raiſe the water, or liquor, as the brewers call it, out of the reſervoir into the water backs, and alſo thoſe which raiſe the worts out of the jack-back into the coppers, be placed ſo that they may be worked by the horſe-mill which grinds the malt.

Explanation of plate XXIV. being a ſection of that part of a large brewhouſe which contains the coppers, maſh-tuns, &c.

a a a a, the coppers.

1 1 1 1, copper-pumps, which throw the wort out of the coppers into the boiling-backs.

2 2 2 2, boiling-backs.

3 3, cocks to ſupply the coppers with water.

4 4 4 4, cocks which convey the water out of the coppers into the maſh-tuns. The water is carried from theſe cocks through a wooden trunk to the bottom of the maſh-tun, above which is a falſe bottom full of ſmall holes, through which the water riſes and wets the malt in the maſh-tun.

5 5 5, maſh-tuns.

6 6 6 6 6, men maſhing, or ſtirring with utenſils, called oars, the malt and water in the maſh-tun.

7, an utenſil called an oar, uſed in maſhing.

8 8 8, the maſhing-ſtage, or floor on which the maſh-tuns are placed.

9 9 9 9, cocks for letting the wort, or, as brewers call it, the goods, out of the maſh-tuns, into the under-backs.

10 10 10, under-backs, which receive the goods from the maſh-tuns.

11, the jack-back. This back is placed ſomething lower than the under-backs, and has a communication with them all; and out of this back the wort is pumped into the coppers.

12, a wort-pump, by which the wort is pumped out of the jack-back in to the coppers. This pump, as well as thoſe which raiſe the water from the reſervoir into the upper-backs, and which could not be ſhewn in the figure, are worked by the horſe-mill which grinds the malt.

13, the miller, or perſon who grinds the malt.

14, a boiling-curb. Its uſe is to prevent the wort from boiling over the copper.

15, the maſter-brewer.

16, a gutter for conveying the wort out of the wort-backs into the cooling-backs.

17, pipes which carry the wort from the wort-pumps into the coppers.

BREWING, the operation of preparing ale, or beer, from malt. The uſual proceſs of brewing is as follows:

the ingredients being ready, the water muſt be made to boil very ſpeedily, and while boiling with the greateſt violence the fire muſt be immediately damped, or put out; when the height of the ſteam is over, the water is put into the maſhing-tub to wet the malt; then ſo much being poured out as to make it of a conſiſtence ſtiff enough to be rowed up, let it ſtand thus a quarter of an hour, after which another quantity of the water is added, and rowed up as before; at laſt the full quantity of water is poured upon it, and that in proportion as the liquor is intended to be ſtrong or weak: this part of the operation is called maſhing. Afterwards the whole may be left to ſtand two or three hours, more or leſs, according to the ſtrength of the wort, or the difference of the weather; then let it run into the receiver, and maſh again for a ſecond wort in the ſame manner as for the firſt, only the water muſt be cooler, and muſt not ſtand above half the time.

The two worts being mixed together, the quantity of hops that is deſigned may be added thereto, and the liquor put into the copper, which being cloſely covered up, let it boil gently for the ſpace of an hour or two; then let the liquor into the receiver, and the hops ſtrained from it into the coolers.

When cool, the yeaſt is applied; which done, it is left to work or ferment, till it be fit to tun up.

For ſmall beer there muſt be a third maſhing; the water muſt be near cold, and to ſtand not above three quarters of an hour; to be hopped and boiled at diſcretion.

For double ale, or beer, the two liquors coming from the two firſt maſhings muſt be uſed as liquor for a third maſhing of freſh malt. For fine ale, the liquor thus brewed is farther prepared with molaſſes: inſtead of yeaſt, or baum, ſome uſe Caſtile ſoap, others flour and eggs, others an eſſential oil of barley, others a quinteſſence of malt, others of wine, and others the ſal panariſtus.

In ordering veſſels for the preſervation of beer, they muſt not at one time be ſcalded, and at another waſhed with cold water: ſome rub the veſſels with hop-leaves, that come out of the wort, and ſo rinſe them again; then being dried in the air, and headed, they take a long piece of canvas, and dipping it in brimſtone make matches thereof, and with a few coriander-ſeeds ſet fire thereto: others opening the bung let the match burn in the veſſel, keeping in as much as they can of the ſulphureous fume, by laying the bung lightly on, and when the match is burnt, they ſtop all cloſe for a little time; then being opened, and coming to the air, the caſk is found to be as ſweet as a violet.

BREYNIA, in botany, a genus of plants, whoſe corolla conſiſts of four oval patent petals, and is ſomewhat larger than the cup: the fruit is a very long, fleſhy, clavated, ſoft pod, formed of two valves, and containing only one cell: the ſeeds are numerous, kidney-ſhaped, fleſhy, and arranged longitudinally in the pod.

BRIAR, or BRIAR BUSH, the wild roſe, with large hairy fruit. See ROSE.

BRIBERY, in common law, is when a perſon in judicial places, takes a gift or reward of any perſon who has buſineſs before him, for his doing his office, or by colour of his office, except the king only, unleſs it be meat and drink.

BRIBERY, in judicial or miniſterial officers, is puniſhed by fine and impriſonment, and the loſs of office; and in a judge it is deemed ſo heinous, that anciently it was puniſhed as treaſon. Judges ſervants are puniſhable for receiving bribes: and if any judge refuſes a bribe offered him, the perſon that offered it may be puniſhed. Officers of the cuſtoms taking any bribe, whereby the crown may be defrauded, forfeit 100l. Candidates that bribe electors, after the teſt of writs of election, &c. are diſabled to ſerve in parliament; as are likewiſe ſuch electors, to vote, and to hold any office, and ſhall forfeit 500l. &c.

BRICK, a fat reddiſh earth, formed into long ſquares, four inches broad, and eight or nine long, by means of a wooden mould, and then baked or burnt in a kiln, to ſerve the purpoſes of building.

Bricks are of great antiquity, as appears by the ſacred writings, the tower and walls of Babylon being built with them. In the eaſt they baked their bricks in the ſun; the Romans uſed them unburnt, only leaving them to dry for four or five years in the air.

Of the Matter whereof BRICKS *are made.*—Pliny ſays, that to make good bricks they muſt not conſiſt of any earth that is full of ſand or gravel, nor of ſuch as is gritty or ſtony; but of a greyiſh marl, or whitiſh chalky clay, or at leaſt of a reddiſh earth: he alſo adds, that the beſt ſeaſon for making bricks is the ſpring, becauſe, if made in ſummer, they will be ſubject to crack, and be full of chinks. He directs, that the loam of which bricks are made, be well ſteeped and wrought with water.

BRICKS, among us, are various, according to their various forms, dimenſions, uſes, method of making, &c. the principal of which are, compaſs bricks, of a circular form, uſed in ſtaining of walls: concave, or hollow bricks, on one ſide flat like a common brick, on the other hollowed, and uſed for conveyance of water: feather-edged bricks, which are like common ſtatute bricks, only thinner on one edge than the other, and uſed for penning up the brick pannels in timber buildings: cogging bricks are uſed for making the indented works under the coping of walls built with great bricks: coping bricks, formed on purpoſe for coping of walls: Dutch or Flemiſh bricks, uſed to pave yards, or ſtables, and for ſoap-boilers vaults and ciſterns: clinkers, ſuch bricks as are glazed by the heat of the fire in making: ſandal or ſamel bricks are ſuch as lie outmoſt in a kiln, or clamp, and conſequently are ſoft and uſeleſs, as not being thoroughly burnt: great bricks are thoſe twelve inches long, ſix broad, and three thick, uſed to build fence walls: plaiſter or buttreſs bricks have a notch at one end, half the breadth of the brick; their uſe is to bind the work which is built of great bricks: ſtatute bricks, or ſmall common bricks, ought, when burnt, to be nine inches long, four and a quarter broad, and two and a half thick; they are commonly uſed in paving cellars, ſinks, hearths, &c.

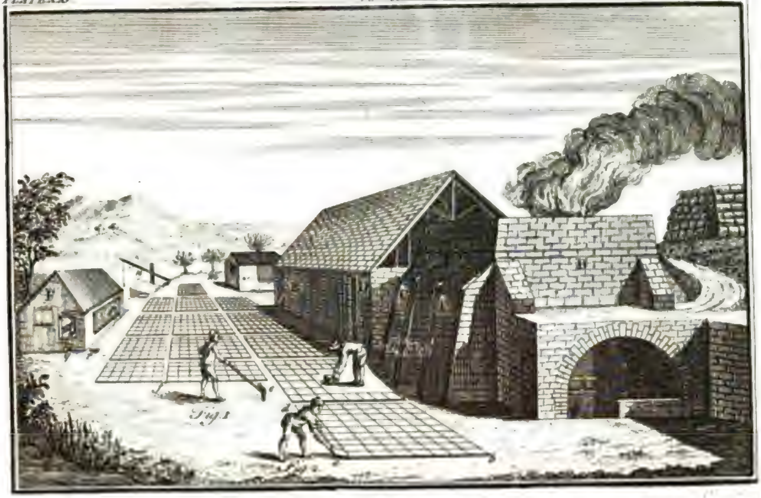
The Method of burning BRICKS.—Bricks are burnt either in a kiln or clamp. Thoſe that are burnt in a kiln are firſt ſet or placed in it, and then the kiln being covered with pieces of bricks, they put in ſome wood, to dry them with a gentle fire; and this they continue till the bricks are pretty dry, which is known by the ſmoke's turning from a darkiſh colour to a tranſparent ſmoke: they then leave off putting in wood, and proceed to make ready for burning, which is performed by putting in bruſh, furze, ſpray, heath, brake, or fern faggots; but before they put in any faggots, they dam up the mouth or mouths of the kiln with pieces of bricks, which they call ſhinlog, piled up one upon another, and cloſe it up with wet break-earth, inſtead of mortar.

The ſhinlog they make ſo high, that there is but juſt room above it to thruſt in a faggot; they then proceed to put in more faggots, till the kiln and its arches look white, and the fire appears at the top of the kiln; upon which they ſlacken the fire for an hour, and let all cool by degrees. This they continue to do alternately, heating and ſlacking, till the ware be thoroughly burnt, which is uſually effected in forty-eight hours.

About London they chiefly burn in clamps, built of the bricks themſelves, after the manner of arches in kilns, with a vacancy between each brick, for the fire to play through; but with this difference, that inſtead of arching, they ſpan it over by making the bricks project one over another, on both ſides of the place, for the wood and coals to lie in till they meet, and are bounded by the bricks at the top, which cloſe all up. The place for the fuel is carried up ſtraight on both ſides, till about three feet high; then they almoſt fill it up with wood, and over that lay a covering of ſea-coal, and then overſpan the arch; but they ſtrew ſea-coal alſo over the clamp betwixt all the rows of bricks; laſtly, they kindle the wood which gives fire to the coal, and when all is burnt, they then conclude the bricks are ſufficiently burnt.

BRICK-MAKING, the art of making and burning bricks.

PLATE XXV. Facing Brickmaking



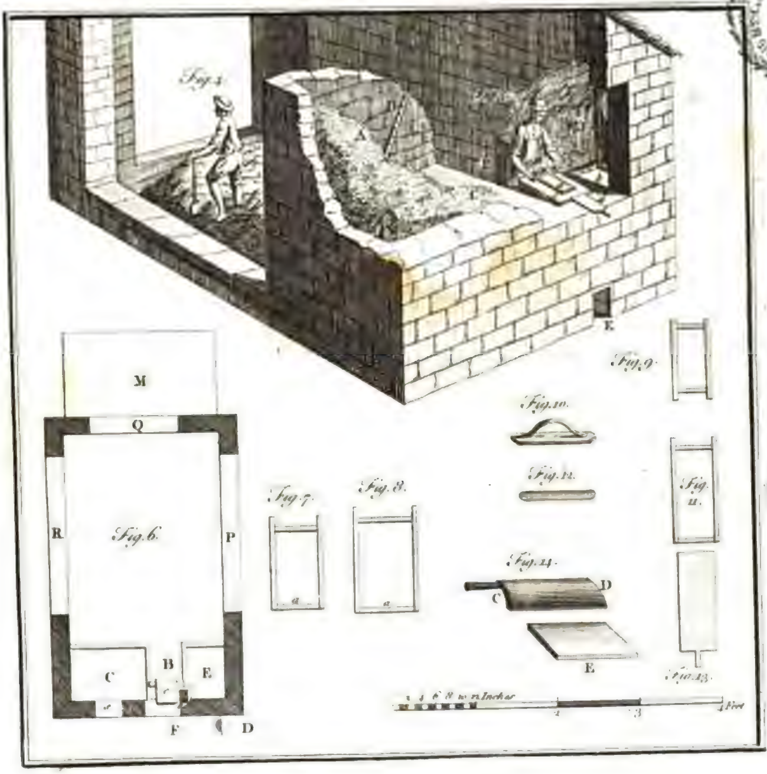


Fig.4.
A
E
M
Q
R
Fig.6.
P
C
B
E
F
D
Fig.7.
a
Fig.8.
a
Fig.9.
Fig.10.
Fig.12.
Fig. 11.
Fig.14.
C
D
E
Fig.13.
2 4 6 8 10 12 Inches
2
3
4 Feet

PLATE XXVI. Facing Bridge

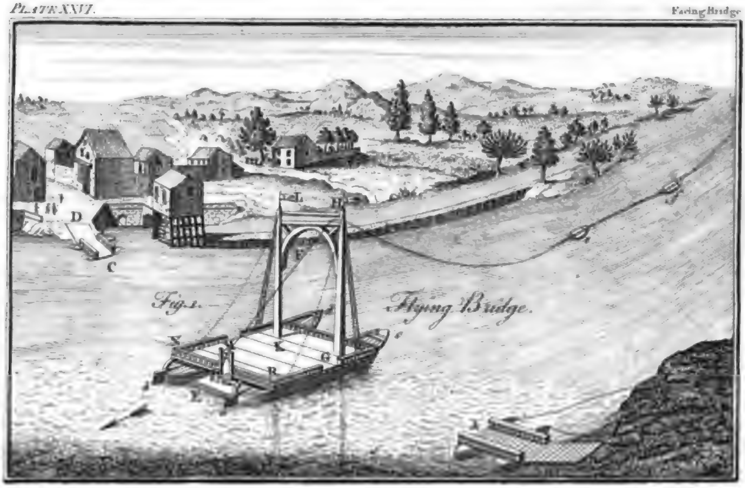


Fig. 1.
Flying Bridge.
L
H
F
D
C
N
K
G
B
E
A

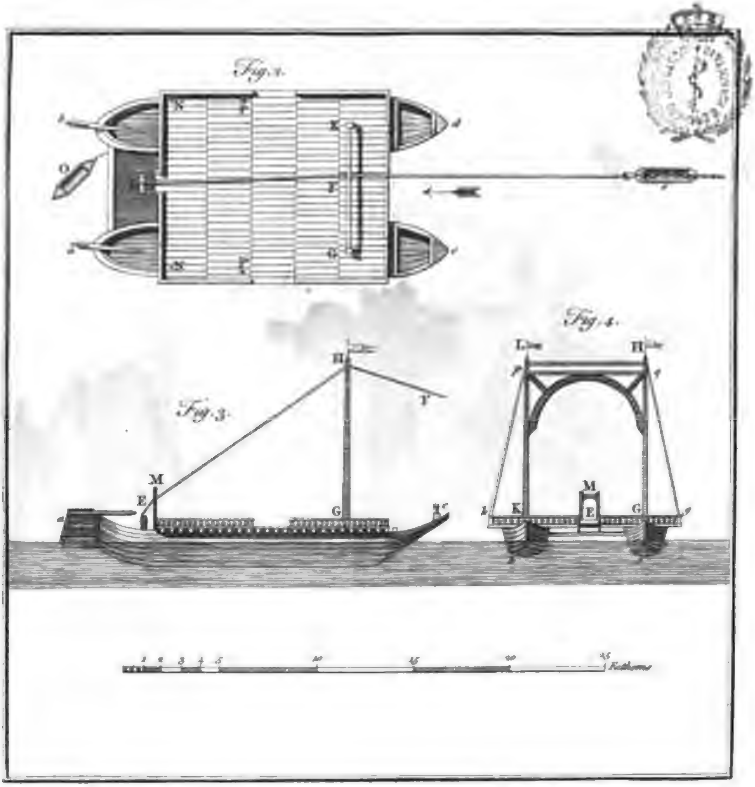


Fig. 2.
N
K
O
F
G
Fig. 3.
H
T
M
E
G
Fig. 4.
L
H
M
K
E
G
1 2 3 4 5 10 15 20 25 Fathoms

Explanation of Plate XXV.

The upper compartment of the plate is a perſpective view of a brick and tile yard.

A, B, C, the kiln, the back of which is erected againſt a mount of earth, nearly equal to the height of the kiln. The walls of the kiln are ſtrengthened and ſupported by ſtrong buttreſſes C, C, between which are two entrances into the kiln. A, the mouth or fire place of the kiln.

D, E, a drying houſe, or long building, in which the bricks and tiles are dried in the ſhade.

F, the moulding houſe, or place where the bricks and tiles are made. It has ſeveral large apertures or windows. The mould, before which the moulder ſtands, is placed on a block in the internal part of the open window in the end F, and into this mould the tempered clay is thrown, in order to give the brick or tile its proper form and ſize, both with regard to length, breadth, and thickneſs. The window at F, which is covered by a hanging tile, ſerves to introduce the ſand to the moulder, it being abſolutely neceſſary that ſome ſand, duſt, &c. be thrown into the mould, and over the block on which the tempered clay or earth is laid, in order to prevent its ſticking to the mould or block. The ſmall aperture *q*, is made in order to take away the ſand that tumbles down under the feet of the moulder. The other apertures, as at *p*, are for receiving the clay or earth as it is dug out of the pit, in order to be trod with the feet, and properly tempered in the hinder part of the building, repreſented at *m*, together with the pit, out of which the clay is dug. *r*, a tub half buried in the earth for holding water, and one half of its mouth covered by a board. The ſquare pieces of board on which the bricks or tiles are carried from the moulder, as well as the ſtriker, &c. are dipt into this water. *n*, a ſmall bridge and machine for drawing the water neceſſary for the workmen, and which is conveyed to the temperer, and other parts of the works by means of trenches.

Fig. 1. A workman preparing and ſmoothing a bed, or piece of ground, *e*, *f*, covered with ſand, for drying the bricks and tiles after they are moulded.

Fig. 2. Repreſents another bed, *a*, *b*, *d*, prepared as before, and two perſons laying down the bricks and tiles to dry. They bring them from the moulder on ſquare pieces of board, which in ſome places are called planchets, and lay them down on the prepared beds to dry.

Fig. 3. The place where the bricks, after having been ſome time expoſed to the open air on the beds deſcribed above, are piled up in order to be carried into the drying houſe, D, E.

Lower compartment of the Plate.

Fig. 4 and 5. The moulding houſe marked F in the upper compartment, laid open.

Fig. 4. Repreſents the back part of the moulding houſe, with the manner of treading and tempering the clay. When the earth is ſufficiently tempered it is carried in parcels into the other part of the houſe, and laid upon a large bench, or bank, placed on the right ſide of the moulder.

Fig. 5. The fore part of the moulding-houſe, with the moulder ſtanding before the block *c*, and between the large benches E, C, which they call banks. The firſt is deſigned to hold the tempered clay, repreſented at D; and the ſecond C, the ſand A, which is ſprinkled on the mould and block, in order to prevent the tempered clay from ſticking to either. The ſand is retained upon the bank by means of boards fixed in the notches of the bracket B, and another of the ſame kind faſtened to the oppoſite wall. *a*, the mould containing the clay, the ſurface of which is taken off very ſmooth and level with the ſides of the mould by means of the ſtriker, which the moulder holds in his hands. *b*, a trough full of water into which the moulder dips the ſtriker, in order to prevent the clay from ſticking to it. *d*, a ſmall board on which the boy carries the bricks afthey are moulded to the beds, in order to their being dried. E, an aperture through which the ſand that tumbles under the feet of the moulder is taken away.

Fig. 6. A plan of the moulding-houſe. M, the pit where the clay is dug. Q, the window through which it is thrown into the back part of the moulding-houſe, or ſpace between the apertures P and R. E, the bank for holding the tempered earth. C, the bank for holding the ſand. *s*, a ſmall window, through which the ſand is thrown upon the bank. *c*, the block on which the mould is placed. *b*, the trough for holding water. F, the place where the carrier ſtands to receive the bricks from the moulder. D, the tub for holding water, into which the carrier dips his planchets.

Fig. 7. A ſmall mould for tiles. The frame, which is half an inch thick, is, in the interior part, from nine to ten inches in length, and ſix in breadth. It has a circular notch at *a*, to receive the earth, in which the carrier makes the hole in the tile.

Fig. 8. A large mould for tiles. It is thirteen inches long and eight broad, and has alſo a circular notch like the former for making the hole in the tile.

Fig. 9. A mould for bricks. The internal ſpace is nine inches long, four inches and a half broad, and two inches and a half deep.

Fig. 10. A piece of board uſed as a ſtriker in making tiles.

Fig. 11. A mould fitted to the planchets uſed by the carrier.

Fig. 12. The ſtriker, or tool with which the moulder ſtrikes off the ſuperfluous earth in making bricks.

Fig. 13. A planchet, or ſmall board, uſed by the perſon who carries the bricks or tiles from the moulder to the drying beds.

Fig. 14. An inſtrument or tool, called by ſome a plier. Its uſe is to form gutter or ridge tiles, or ſuch as are convex on one ſide and concave on the other, and which form they receive after they are moulded by means of this tool. C is the handle of the tool, D its upper extremity, and E the tile as it came from the moulder.

Oil of Bricks, olive oil imbibed by heated bricks, which are afterwards broken, put into a retort, and the oil again extracted from them by an open fire.

BRICKLAYER, a perſon who lays bricks in the building of walls, houſes, &c.

Tilers and bricklayers were incorporated 10 Eliz. under the name of maſter and wardens of the ſociety of freemen of the myſtery and art of tilers and bricklayers.

BRIDGE, an edifice either of ſtone or timber, conſiſting of one or more arches erected over a river, canal, or the like, for the conveniency of croſſing or paſſing over from one ſide to the other.

The firſt inventor of bridges, as well as of ſhips and crowns, is, by ſome learned men, ſuppoſed to be Janus; their reaſon is, that, in ſeveral ancient Greek, Sicilian, and Italian coins, there are repreſented on one ſide a Janus, with two faces, and on the other a bridge, or a crown, or a ſhip.

The parts of a bridge are the piers, or legs, pilæ; the arches; the pavement, or way over for cattle and carriages, the foot-banks on each ſide for foot paſſengers; the rail or parapet which incloſes the whole; and the butments, or ends of the bridge on the banks.

Bridges are a ſort of edifices very difficult to execute, on account of the inconvenience of laying foundations, and walling under water. The earlieſt rules and inſtructions relating to the building of bridges are given by Leon Baptiſta Alberti, Archit. l. 8. Others were afterwards laid down by Palladio, l. 3. Serlio, l. 3. c. 4 and Scammozzi, l. 5. all of which are collected by M. Blondel, Cours d'Archit. P. 5. l. 1. p. 629. *ſeq.* The beſt of them are alſo given by Goldman, Baukunſt, l. 4. c. 4. p. 134, and Hawkſmoor's Hiſtory of London Bridge, p. 26. *ſeq.* M. Gautier has a piece, expreſs on bridges, ancient and modern, Trait. des Ponts. Paris 1716, 12°.

The conditions required in bridges are, that they be well-deſigned, commodious, durable, and ſuitably decorated. The piers of ſtone bridges are to be equal in number, that there may be one arch in the middle where commonly the current is ſtrongeſt: their thickneſs is not to be leſs than a ſixth part of the ſpan of the arch, nor more than a fourth. They are commonly guarded in front with an angular ſtarling, or ſpur, to break the force of the current, though this defence is ſometimes alſo turned ſemicircularly: in the ancient bridges it is always a right angle, which has the advantage of being ſtronger and more durable than acute ones. The ſtrongeſt arches are thoſe whoſe ſweep is a compleat ſemicircle; as for the rails, the height, ornaments, and the like, they are left to diſcretion. It is even complained, that no demonſtrative reaſons are given of the ſeveral proportions of the moſt eſſential parts of bridges; much of which is ſtill left to the diſcretion of the builder, to be regulated according to the circumſtances, deſign, place, magnitude, &c. of the deſigned edifice. Mr. Gautier wiſhes, that mathematical perſons would take the ſtructure and proportions of bridges into their conſideration, in order to bring things to more certainty and preciſion, founded on unvariable geometrical truth. Something of which kind has been attempted by M. de la Hire, in *Mem. Acad. R. Scienc. an.* 1712, p. 70, and the Marquis de l'Hoſpital, in *Act. Erud. Lipſ.* 1695, p. 56.

With regard to the theory of bridges, we ſhall endeavour to render it as clear as may be, by the ſolutions to the following problems.

Problem 1. To find the nature of the extrados V P X (plate XXIII. *fig.* 12.) of the propoſed circular arch A d Y, ſuch that the parts thereof ſhall be in equilibrio by the weights of the vouſſoirs alone, without the help of any wall or counterfort, provided only that the abutments be of ſufficient ſtrength to bear the weight of the whole arch.

Solution. Let B be the center of the circular arch AdY, A B its vertical radius, B K the horizontal one, at right angles to each other; and ſuppoſe $gdmn$, (whoſe joints gd, mn, being produced, would paſs through the center B) one of the vouſſoirs, whoſe extrados gn is required. Produce B A to O, ſo that the axis of the key-ſtone Q P V Z may be of the given length; draw an indefinite tangent, as C A T to the point A, the vertex of the arch. From the points d, m, (ſuppoſed indefinitely near each other) let fall upon A B the perpendiculars dF, mE; and alſo dG perpendicular to m E. On B, as center with the radius Bg, deſcribe the arch gp, interſecting B mn in p; let R and T be the points in which the joints Bg and Bn, interſect the horizontal line A T. The angles FdB, A R B or A T B are equal, becauſe of the parallels A R, Fd, and the indefinitely ſmall arch dm; moreover, the angles FdG, B dm, being right ones, the triangles B F d, mG d, will be ſimilar. Put $AB=a$, $BF=u$, $Fd=y$, $dG=FE=\dot{u}$, $Gm=\dot{y}$, $Bg=s$, and $BO=f$; then $BF : Bd :: MG : md$; that is, $u : a :: \dot{y} : \frac{a\dot{y}}{u}=md$, and again $BF : Fd :: BA : AR$; whence $AR=\frac{ay}{u}$, whoſe fluxion $\frac{au\dot{y}-ay\dot{u}}{u^2}=RT$. Now, becauſe $u^2+y^2=aa$, we have $\dot{u}=\frac{-y\dot{y}}{u}$, let this value of $\dot{u}$ be ſubſtituted in the above expreſſion for R T, it becomes $\frac{a^3\dot{y}}{u^3}$. It appears by Corol. 3 Problem XLI. of Clark's Mechanics, that if T R be multiplied by ſome conſtant quantity as b, the product will expound the weight with which the vouſſoir dn muſt be charged, in order to preſerve the equilibrium of the arch. Now as the ſolid part of the arch is compriſed between two vertical planes, it is evident, that the faces of the vouſſoirs, which are the trapezia $gdmn$, or $gdmp$, may ſerve to expound the weights of the vouſſoirs; therefore $gdmp$ will always be equal to $\frac{a^3b\dot{y}}{u^3}$. But by reaſon of the ſimilar ſectors Bdm, Bgp, we have $\overline{Bd}^2(a^2) : \overline{Bg}^2-\overline{Bd}^2(ss-aa) :: Bdm\left(\frac{a\dot{y}}{u}\times\frac{a}{2}\right) : dgpm\left(\overline{ss-aa}\times\frac{\dot{y}}{2u}\right)$ hence $\overline{s^2-a^2}\times\frac{\dot{y}}{2u}=\frac{a^3b\dot{y}}{u^3}$, and $ss-aa=\frac{2a^3b}{u^2}$, from whence we get $s=\frac{a}{u}\times\sqrt{2ab+u^2}$, this, when $u=a$, becomes $ff=2ab+aa$, conſequently $b=\frac{ff-aa}{2a}$; let this value of b be ſubſtituted in the equation $s=\frac{a}{b}\sqrt{2ab+u^2}$, it becomes $s=\frac{a}{u}\times\sqrt{f^2-a^2+u^2}$; draw the ordinate g I to the axis OB; then will B I be a fourth proportional to Bd, B F, B G, and is therefore equal to $\sqrt{ff-a^2+u^2}$; hence this conſtruction:

Take the key-ſtone Q P V Z Q at pleaſure, the lines V Z, P Q, tending to the center B. From A, draw the horizontal line C A T; and from the center B, with B O as radius, deſcribe the circular arch O C, meeting T A C in C; take any point at pleaſure, as d, upon the intrados, and make A H equal to the perpendicular diſtance of d from the radius B K. Draw C H, make B I $=$ H C; and from I, draw I g, meeting B d produced in g, which will be one point in the required extrados; in the ſame manner other points may be found, by which the extrados O g X may be determined.

If A D (plate XXIII. *fig.* 11.) be a given arch, whoſe extrados is p T N, axis A b, ſemiſpan ba, and A p the given height of the vertex of the required extrados from that of the arch; and from A, a right line A M P be drawn parallel to the horizontal line ba; alſo through any point M, a right line parallel to A b; then will T e (A ba being a quadrant of a circle), the height of the extrados above the point e of the propoſed arch, be inverſely as the cube of the right ſine ed. But if A ea be the arch of an ellipſis; then having firſt multiplied the ſquare of ed, by the ſquare of the ſemi-tranſverſe ba, and the ſquare of the horizontal diſtance A M, by the ſquare of the ſemi-conjugate A b, and ſubtracted one product from the other, the height e T of the required extrados will be directly as that difference, and inverſely as the cube of ed.

If the propoſed arch be the curve of an hyperbola; then, having multiplied the ſquare of the de's by that of the ſemi-ordinate ba, and the ſquare of the horizontal diſtances A M, by the correſponding part A b of the axis, and taken the ſum of thoſe products, the ratio of the heights e T will be compounded of the direct ratio of thoſe ſums, and inverſe ratio of the cubes of the heights de. M. Parent's *Eſſais & Reſcherches de Mathematique*, vol. 3. p. 168.

Problem 2. To determine the thickneſs of the piers neceſſary to ſuſtain in equilibrio the parts of a propoſed ſemi-circular arch.

Solution. Let S Z (plate XXIII. *fig.* 16.) be one of the required piers of the ſemi-circular arch, whoſe half is repreſented by B E D G. Through L, the middle of F C, draw M K parallel to Z A, and produce P Z to M. Let fall L V perpendicular upon A B; and from L draw L O at right angles to L A, meeting the perpendicular P O in O. From Q, the center of gravity of the vouſſoir C E, let fall Q R perpendicular upon the baſe S P of the pier, biſect P S in T; call L K or K A, a, L A, b, B V, c, Z P, d, Z B or R S, g, P S, y; then will M L or M N be equal to $c+y$, and $MP=a+d$; conſequently $NP=a+d-c-y$. Put $a+d-c=f$, then $NP=f-y$, and $PR=y-g$. If for the ſurface of the vouſſoir C G, or its equal C E, we put n^2, then will $\frac{bn^2}{a}$ expreſs the force of the vouſſoir in the direction L O. By ſimilar the triangles L K A, N O P, we have L A (b) : L K (a) :: N P ($f-y$) : P O equal to $\frac{af-ay}{b}$, which being multiplied by $\frac{bn^2}{a}$, gives n^2f-n^2y for the force acting at right angles upon the arm P O of the lever R P O, whoſe center of motion is P; therefore, by the well known properties of the lever, $n^2\times\overline{y-g}$ and $\frac{dy^2}{2}$, are the reſpective forces acting at the points T, R, in a direction perpendicular to the horizon; and conſequently $nnf-nny=\frac{ddy}{2}+n^2y-n^2g$. From this equation, by compleating the ſquare and proper reduction, we get $y=\sqrt{\frac{2n^2f+2n^2g}{d}+\frac{4n^4}{d^2}}-\frac{2n^2}{d}$.

When the extrados of the arch B D H (plate XXIII. *fig.* 14.) is terminated by a horizontal line Q X; then, having taken F C = D G, and drawn L O perpendicular to F C, in the middle point L as before, and other things remaining ſtill the ſame, put M P $=f$, then by the ſimilar triangles L K A, P O N, we have L A : L K :: P N : P O, whence P O $=\frac{af-ae-ay}{b}$. Now the abſolute weight of the vouſſoir C W G D, here ſuppoſed $=n^2$, is to the force thereof, acting in the direction L O, as L K : L A by the nature of bodies reſting upon inclined planes, and is therefore equal to $\frac{n^2 b}{a}$, which, being multiplied by P O, becomes $fnn-enn-n^2 y$: and this product muſt, by the nature of the lever, be equal to the weight of the pier P Q R S, multiplied by P T; hence this equation, $fn^2-en^2-n^2 y=\frac{dy^2}{2}$, from whence we get $y=\frac{n^4}{d^2}-\frac{n^2}{d}+\sqrt{\frac{2fn^2-2en^2}{d}}$.

Problem 3. To determine the thickneſs of the piers neceſſary to ſuſtain in equilibrio the parts of a propoſed ſemi-elliptical arch.

Solution. Let S Z (plate XXIII. *fig.* 15.) be one of the required piers of the ſemi-elliptical arch, whoſe half is repreſented by B E G D. From the middle of the arch B D, draw L O a tangent to that point, and erect the perpendicular L A, which produce to A. From L, let fall P O perpendicular upon L O; and through L, draw M L K parallel to the ſemi-tranverſe axis B H. Put L K $=a$, K A $=b$, L A $=c$, B V $=d$, B S $=f$, M P $=g$, n^2 for the ſurface of the vouſſoir C G, nearly equal to F B, Z B $=y$. By the ſimilar triangles L K A, L M N, we have A K : K L :: L M : M N; whence M N $=\frac{ay+ad}{b}$, and thence N P $=\frac{gb-ad-ay}{b}$: and again, by the ſimilar triangles L K O, N O P, we get P O $=\frac{gb-ad-ay}{c}$.

Now the abſolute weight of the vouſſoir L F G D, is to its preſſure upon F L, as L K to L A; conſequently $\frac{cn^2}{a}\times\frac{gb-dd-ay}{c}$, expreſſes the force acting upon the point O, in the direction L O. On the other hand, the reſiſtance of the pier S Z will be expreſſed by $\frac{fy^2}{2}+ny^2$ (P T being equal to T S, and P conſidered as the center of motion of the lever O P T): hence, by making the force and reſiſtance equal, we ſhall have $\frac{gbn^2}{a}-dn^2-n^2 y=\frac{fy^2}{2}+n^2 y$; and conſequently $y=\sqrt{\frac{2gbn^2}{af}-\frac{2dn^2}{f}+\frac{4n^4}{f^2}}-\frac{2n^2}{f}$.

Problem 4. To determine the thickneſs of the piers neceſſary to ſupport in equilibrio the propoſed vouſſoirs, when ranged in a right liue.

Solution. Upon L F (*fig.* 13.) the given diſtance between the piers deſcribe an equilateral triangle L A F; and divide its baſe L F, into as many equal parts as there are vouſſoirs. From A, draw through thoſe points of diviſion right lines terminating in the indefinite right line G I (drawn parallel to L F, at a given diſtance therefrom) in the points E, C, D, &c. From L draw L O at right angles to A D, and from P let fall P O perpendicular thereon. Produce K L to M, and draw A K C perpendicular to L F. Put K L $=a$ K A $=b$, M P $=f$, L M $=y$, and n^2 for the area of L D C K.

The triangles A K L, L M N, and N O P, are ſimilar; hence K A (b) : K L (a) :: L M (y) : M N $\left(\frac{ay}{b}\right)$; and conſequently N P $=\frac{fb-ay}{b}$. Again, A L $(2a)$: A K (b) :: N P $\left(\frac{fb-ay}{b}\right)$: P O $\frac{fb-ay}{2a}$. The abſolute weight of L D C K is to its force upon the pier S M, as L K to L A; but L A is double to L K. Therefore the force acting upon O in the direction L O may be expounded by $2nn$, which being multiplied by P O, gives $\frac{bfn^2}{a}-n^2 y$; for the force acting upon P at the diſtance P O, which, by the property of the lever, muſt be equal to the force acting upon the point D, at the diſtance of half P S therefrom. But this is expounded by $\frac{fyy}{2}$, hence $\frac{bfnn}{a}-nny=\frac{fyy}{2}$; and conſequently $y=\sqrt{\frac{2bny}{a^2}+\frac{n^4}{f^2}}-\frac{n^2}{f}$.

In the bridges of Avignon, St. Eſprit, and Lyons, there is this remarkable that they are not ſtraight, eſpecially the two former, but bent, having an angle, whoſe convexity is turned towards the ſtream to break the force thereof: the pont St. Eſprit, Dr. Robinſon obſerves, is bowed in many places, making unequal angles, eſpecially in thoſe parts where the ſtream is ſtrongeſt.

The famous bridge of Venice, called the Rialto, conſiſts but of a ſingle arch, and that a flat or low one, paſſing for a maſter-piece of art, being built in 1591, on the deſign of Michael Angelo: the ſpan of the arch is ninety-eight feet and a half, and its height above the water only twenty-three feet.—Poulet alſo mentions a bridge of a ſingle arch in the city of Munſter in Bothnia, much bolder than that of the Rialto at Venice. But theſe are nothing to a bridge in China, built from one mountain to another, conſiſting of one ſingle arch, 400 cubits long, and 500 cubits high, whence it is called the flying bridge, a figure of it is given in the Philoſophical Tranſactions. Kircher alſo ſpeaks of a bridge in the ſame country 360 perches long without any arch, ſupported only by 300 pillars.

Among all the bridges of the ancients, that built by Trajan over the Danube is allowed to be the grandeſt. It was compoſed of twenty arches of an hundred and fifty feet in height, and their opening from one pile, or pier, to another was one hundred and ſixty feet. The piers of this fine bridge are ſtill to be ſeen in the middle of the Danube. It was erected between Servia and Moldavia, a little above Nicopolis.

Wooden BRIDGES, called by the Latins, *pontes ſublicii*, conſiſt of beams and joiſts, ſuſtained by punchions, well cramped and bound together.

Sturminus has a diſſertation expreſs on the ſtructure of a wooden bridge. *Diſp. de Ponte Sublicio, Francof.* 1709.

Ruſhen BRIDGE, *point de jonc*, is made of large ſheaves of ruſhes growing in marſhy grounds, which they cover over with boards or planks; they ſerve for croſſing ground that is boggy, miry, or rotten.

The Romans had alſo a ſort of ſubitaneous bridges made by the ſoldiers, of boats, or ſometimes of caſks, leathern bottles, or bags, or even of bullock's bladders blown up, and faſtened together, called aſcogafri. Pitiſc. L. *Ant.* t. 2. p. 464. *ſeq. voc. Pontes.* Du Cange *Gloſſ. Lat.* t. 1. p. 350. M. Couplet gives the ſtructure of a portable bridge, 200 feet long, eaſily taken aſunder and put together again, and which forty men may carry.—Vid. Du Hamel, *Hiſt. Reg. Acad. Scienc.* l. 3. § 5. c. 4. p. 273.

Frezier ſpeaks of a wonderful kind of bridge at Apurima in Lima, made of ropes, formed of the bark of a tree.—Vid. Frez. *Voyag. South-Sea*, p. 184.

Pendent or *Hanging* BRIDGES, called alſo *Philoſophical* BRIDGES, are thoſe not ſupported either by poſts or pillars, but hung at large in the air, only ſupported at the two ends, or butments. Inſtances of ſuch bridges are given by Palladio and others.—Vid. Vogel's *Modern. Bau-Kunſt.* tab. 26. *ſeq.* Wolf. L. Math. p. 277. voc. Brucke. Kirch. *Mund. Subterr.* l. 1. c. 3. t. 1. p. 14.

Dr. Wallis gives the deſign of a timber-bridge, ſeventy feet long, without any pillars, which may be uſeful in ſome places where pillars cannot conveniently be erected. *Phil. Tranſ.* No. 163. p. 714.

Dr. Plot aſſures us, that there was formerly a large bridge over the caſtle-ditch at Tutbury in Staffordſhire, made of pieces of timber, none much above a yard long, and yet not ſupported underneath, either with pillars or arch-work, or any ſort of prop whatever. Vid. Plot. *Nat. Hiſt. Stafford.* c. 9. §. 88. p. 383.

Draw-**Bridge**, *Pons Subductarius*, is ſuch a one as is made faſt only at one end with hinges, ſo that the other end may be lifted up; in which caſe the bridge ſtands upright, to prevent the paſſage of either ditch or moat.

There are others made to draw back to hinder the paſſage, and to thruſt over again to afford a paſſage; and others, which open in the middle, half of which turns away to one ſide, and the other half to the other; being joined again at pleaſure: but they have this inconvenience, that one half of them remains on the enemy's ſide.

Flying-**Bridge**, *Pont volant*, or *Pons ductarius*, an appellation given to a bridge made of pontoons, leather boats, hollow beams, caſks, or the like, laid on a river, and covered with planks, for the paſſage of an army.

Flying-**Bridge**, *Pont volant*, more particularly denotes a bridge compoſed of one or two boats joined together by a ſort of flooring, and ſurrounded with a rail, or balluſtrade; having alſo one or more maſts, to which is faſtened a cable, ſupported, at proper diſtances, by boats, and extended to an anchor, to which the other end is faſtened, in the middle of the water: by which contrivance, the bridge becomes movable, like a pendulum, from one ſide of the river to the other, without any other help than the rudder.—Such bridges ſometimes alſo conſiſt of two ſtories, for the quicker paſſage of a great number of men, or that both infantry and cavalry may paſs at the ſame time.

See Plate XXVI. which repreſents a flying-bridge of this kind.

The upper compartment of the plate marked *fig.* 1. is a perſpective view of the courſe of a river and its two banks.

a, *b*, *c*, *d*, two long boats or batteaux, which ſupport the flying-bridge.

G H, K L, two maſts joined at their tops by two tranſverſe pieces, or beams, and a central arch, and ſupported in a vertical poſition by two pair of ſhrowds, and two chains L N, H R.

M, a horſe, or croſs-piece over which the rope or cable M, F, *e*, *f*, that rides or holds the bridge againſt the current, paſſes.

E, a roll or windlaſs round which the rope M, F, *e*, *f*, is wound.

a, *b*, the rudders.

A B, and C D, two portions of bridges of boats faſtened to the bank on each ſide, and between which the flying bridge moves in paſſing from one ſide of the river to the other.

e, *f*, chains ſupported by two punts, or ſmall flat-bottomed boats: there are five or ſix of theſe punts at about forty fathoms from one another. The firſt, or fartheſt from the bridge, is moored with anchors in the middle of the bed of the river.

Fig. 2. is a plan of the ſame bridge.

a, *b*, *c*, *d*, the two boats that ſupport it.

K and G, the two maſts.

K G, the tranſverſe piece or beam over which the cable paſſes.

E, the roll, or windlaſs, round which the rope or cable is wound.

a, *b*, the rudders.

O, a boat.

e, one of the punts, or ſmall flat-bottomed boats that ſupport the chain.

N, N, pumps for extracting the water out of the boats.

P, P, capſtans.

Fig. 3. Lateral elevation of the bridge.

a, *c*, one of the boats.

a, the rudder.

E, the roll, or windlaſs.

M, the horſe, or croſs-piece.

G H, one of the maſts.

E, M, H, F, the cable.

In this view the baluſtrade running along the ſide of the bridge is plainly exhibited.

Fig. 4. Elevation of the hinder, or ſtern part of the bridge.

a, *b*, the two boats.

G H, K L, the two maſts.

H L, the upper tranſverſe beam.

p, *q*, the lower tranſverſe beam, or that over which the cable paſſes, and on which it ſlides from one maſt to the other; this beam is therefore always kept well greaſed.

p k, *q g*, ſhrowds extending from the ſides of the bridge to the tops of the maſts.

M, the horſe or croſs-piece over which the cable paſſes to the roll or windlaſs E.

Flying, or *Floating*-**Bridge**, is ordinarily made of two ſmall bridges, laid one over the other, in ſuch manner, as that the uppermoſt ſtretches and runs out, by the help of certain cords running through pullies placed along the ſides of the under-bridge, which puſh it forwards till the end of it joins the place it is deſigned to be fixt on.

When theſe two bridges are ſtretched out to their full length, ſo that the two middle ends meet, they are not to be above four or five fathoms long; becauſe, if longer, they will break.

Their chief uſe is for ſurpriſing out-works, or poſts that have but narrow moats.

In the Memoirs of the Royal Academy of Sciences we find an ingenious contrivance of a floating bridge, which lays itſelf on the other ſide of the river. Vid. *Hiſt. Acad. R. Scienc.* an. 1713. p. 104.

Bridge *of Communication* is a bridge made over a river, by which two armies, or forts, ſeparated by the river, have a free communication with each other.

Bridges *of Boats* are either made of copper or wooden boats, faſtened with ſtakes, or anchors, and laid over with planks.

One of the moſt notable exploits of Julius Cæſar was the expeditious making a bridge of boats over the Rhine. Modern armies carry copper or tin boats, called pontoons, to be in readineſs for the making bridges; ſeveral of theſe being joined ſide by ſide till they reach acroſs the river, and planks laid over them, make a plane for the men to march on.

There are fine bridges of boats at Beaucaire and Rouen, which riſe and fall with the water, and that at Seville is ſaid to exceed them both.

The bridge of boats at Rouen, built in lieu of the ſtately ſtone bridge erected there by the Romans, is repreſented by a modern writer as the wonder of the preſent age. It always floats, and riſes and falls with the tide, or as the land-waters fill the river. It is near 300 yards long, and is paved with ſtone, juſt as the ſtreets are; carriages with the greateſt burdens go over it with eaſe, and men and horſes with ſafety, though there are no rails on either hand. The boats are very firm, and well moored with ſtrong chains, and the whole well looked after, and conſtantly repaired, though now very old.

Bridge, in gunnery, the two pieces of timber which go between the two tranſums of a gun carriage, on which the bed reſts.

Bridge, in muſic, a term for that part of ſtringed inſtruments over which the ſtrings are ſtretched. The bridge of a violin is about one inch and a quarter high, and near an inch and a half long.

BRIDLE, in the menage, a contrivance made of ſtraps or thongs of leather, and pieces of iron, in order to keep a horſe in ſubjection and obedience.

The ſeveral parts of a bridle are, the bit, or ſnaffle; the head-ſtall, or leathers from the top of the head to the rings of the bit; the fillet, over the forehead and under the fore-top; the throat-band, which buttons from the head-band under the throat; the reins, or long thongs of leather, that come from the rings of the bit, and, being caſt over the horſe's head, the rider holds them in his hand; the noſe-band, going through loops at the back of the head-ſtall, and buckled under the cheeks; the trench; the caveſan; the martingal; and the chaff-halter.

Bridle-*Hand* is the horſeman's left-hand, the right hand being the ſpear or ſword-hand.

To ſwallow the **Bridle**, is ſaid of a horſe that has too wide a mouth, and too ſmall a bit-mouth.

Bridle, *Frænum*, in anatomy. See the article **Frænum**.

BRIDLES, in naval affairs, the upper-part of the moorings, provided to ride ſhips or veſſels of war in the king's harbours: they conſiſt of one or more pieces of cable, whoſe upper-ends are only of a ſufficient length to be drawn into the fore-part of the ſhip, and faſtened; the lower parts are generally chains linked to anchors, which are ſunk for that purpoſe, and always remain in the bottom.

Bowline-BRIDLES, amongſt ſeamen, has been mentioned in the article BOWLINE, that its uſe is to bind the weather or windward edge of the ſail tight forward on a ſide wind; but as a ſingle rope would only act on one part of the ſail, it has been found neceſſary to give it the additional power of bridles, which are faſtened above and below to three or four places in the ſide of the ſail, and all unite in the bowline.

BRIEF, in common law, a writ whereby a man is ſummoned or attached to anſwer any action.

It is called brief becauſe it is couched in a few words, without any preamble.

BRIEF is alſo uſed for a writing iſſued out of any of the king's courts of record at Weſtminſter, whereby ſomething is commanded to be done, in order to juſtice, or the execution of the king's command.

BRIEF is alſo taken for a letter-patent, granting a licence to a ſubject to make collection for any public or private loſs, as briefs for loſs by fire, to be read by miniſters in churches, &c.

BRIEF is likewiſe an abridgement of a client's caſe, wrote out for the inſtruction of counſel, on a trial at law.

Apoſtolical BRIEFS, letters which the pope diſpatches to princes, or other magiſtrates, relating to any public affair.

BRIG, or BRIGANTINE, a ſmall merchant ſhip of two maſts, whoſe main-ſail, inſtead of hanging acroſs the line of her length to a parallel yard, is ſpread fore and aft, the inner or foremoſt edge of it being faſtened in different places to ſeveral ſtrong hoops on the main-maſt; and the aftmoſt or outer-edge, ſtretched to a boom below, which reaches over the ſtern, and by a gaff above, i. e. a long pole with a broad ſemi-circular notch in the fore-end that clings to the maſt. By this, and the hoops about the maſt, the main-ſail is eaſily hoiſted and lowered at pleaſure. The outer-end of the gaff is peeked about $\frac{1}{7}$ of the ſail's depth above the inner-end. The term brigantine is variouſly applied by ſeamen of different countries in Europe to ſome particular ſpecies of veſſels of their own marine.

BRIGADE, in the military art, a party or diviſion of a body of ſoldiers, whether horſe or foot, under the command of a brigadier.

An army is divided into brigades of horſe and brigades of foot: a brigade of horſe is a body of eight or ten ſquadrons; a brigade of foot conſiſts of four, five, or ſix battalions.

The eldeſt brigade has the right of the firſt line, and the ſecond the right of the ſecond, and the two next take the left of the two lines, and the youngeſt ſtand in the center.

BRIGADE-MAJOR is an officer appointed by the brigadier, to aſſiſt him in the management and ordering of his brigade.

BRIGADIER is the general officer who has the command of a brigade. The eldeſt colonels are generally advanced to this poſt. He that is upon duty is brigadier of the day. They march at the head of their own brigades, and are allowed a ſerjeant and ten men of their own brigade for their guard.

BRILLIANT, in a general ſenſe, ſomething that has a lucid and bright appearance.

BRILLIANT *Diamonds*. See the article DIAMOND.

BRIMSTONE, in natural hiſtory, the ſame with ſulphur. See SULPHUR.

BRINE, water replete with ſaline particles; or pickle. See SALT.

BRISTOL-WATER. Theſe waters are the fourth in degree amongſt the waters which are eſteemed warm. The waters of bath are the firſt, Buxton the ſecond, and Matlock the third.

Bath waters are beneficial, when the ſecretions from the blood are diminiſhed; Briſtol, when too much increaſed: Bath attenuates powerfully; Briſtol incraſſates: Bath is ſpirituous, and helps defects; Briſtol is more cooling, and ſuppreſſes plenitude, with its conſequences, inflammations and hæmorrhages.

If we may judge of the contents of Briſtol waters, from their effects, which are exceedingly deterſive and healing, they partake chiefly of chalk, lapis calcarius, and calaminaris, the virtues of which are too dry to cleanſe; they fill ulcers with fleſh, and cicatrize them.

But whatever the ſubſtances are that impregnate them, it is plain they are very ſubtile, and that there is but little of a terreſtrial part in them, from their ſpecific lightneſs above other waters: yet when we conſider how agreeable to the ſight, ſmell, and taſte; how clear, pure, and ſoft they are; their gentle degree of heat, ſo adapted to ſundry diſeaſes, it muſt be concluded, that thoſe waters do imbibe ſome ſalutary particles in their paſſage through the earth, and from the many cures yearly wrought by them, that they have an undoubted title to a place in the firſt claſs of medicinal waters.

The diſeaſes in which Briſtol waters are properly preſcribed, are internal hæmorrhages, and inflammations, blood-ſpitting, dyſentry, and immoderate flux of the menſes, purulent ulcers of the viſcera: hence in conſumptions, the dropſy, ſcurvy with heat, ſtone, gravel, ſtrangury; the habitual gout, ſcorbutic rheumatiſm, diabetes, ſlow fevers, atrophy, venereal diſeaſe, cancer, gleets, in both ſexes, king's evil, &c. in all theſe diſorders, Bath waters are not only improper, but hurtful; they rouſe the too languid, and quicken the too lazy circulation; they allay the heat, and reſtrain the too rapid motion of the blood. The former attemperate the choleric, and the latter impregnate the phlegmatic. In ſhort, Bath water ſeems to be adapted to the maladies of the ſtomach, guts, and nerves; Briſtol, to thoſe of the lungs, kidneys, and bladder: again, Bath waters are at variance with a milk courſe; and the Briſtol can never be judiciouſly directed, but when they may be joined with reaſon and ſucceſs.

The Briſtol-waters are taken medicinally only during the hot months, as from April to September.

BRITAIN, or GREAT-BRITAIN, the moſt conſiderable of all the European iſlands, lies between 50° and 60° north latitude, and between 2° eaſt longitude, and 6° weſt longitude.

The general diviſion of Britain, is into South and North Britain, or England and Scotland. See the articles ENGLAND and SCOTLAND.

BRITANNICA, among ancient phyſicians, the name by which they called the great water-dock; a powerful aſtringent, which they preſcribed in hæmorrhages, and other fluxes. See LAPATHUM.

BRITTLENESS, that quality of bodies on account of which they are denominated brittle; or which ſubjects them to be eaſily broken.

BRIZE, in huſbandry, denotes ground that has lain long untilled.

BRIZE-VENTS, ſhelters uſed by gardeners who have not walls on the north-ſide, to keep the cold winds from damaging their beds of melons. They are incloſures about ſix or ſeven feet high, and an inch or more thick; made of ſtraw, ſupported by ſtakes fixed into the ground, and props acroſs on both inſide and outſide; and faſtened together with willow-twigs, or iron wire.

BROACHING-TO, in navigation, the act of bringing a ſhip's ſide to the wind, when ſhe had been ſteering before it: this is a moſt dangerous incident, and is often apt to prove fatal, as a ſhip may be overturned at the time of broaching to, ſince ſhe can always carry more ſail before the wind than when bearing her ſide to it; it is occaſioned only by the negligence or incapacity of the helmſman.

BROAD, an appellation given to things whoſe breadth bears a conſiderable proportion to their length.

BROADSIDE, in naval affairs, the whole diſcharge of the artillery on one ſide of a ſhip of war upon an enemy.

BROCADE, or BROCADO, a ſtuff of gold, ſilver, or ſilk, raiſed and enriched with flowers, foliages, and other ornaments, according to the fancy of the merchants or manufacturers.

Brocade-Shell, the Engliſh name of the coronated cylindrus, of a ſilvery white colour, variegated with brown.

BROCCOLI, in gardening, the name of a well known plant, of which there are three ſorts; namely, the common broccoli, the green broccoli, and the Siberian broccoli, which is the curled colewort, by ſome called Scotch kale. All theſe are for winter uſe; but the laſt is moſt eſteemed. The two former are ſown about the middle of April, and are fit for tranſplanting in about two months after. When this is done, the plants of either of theſe ſorts ſhould be ſet a foot aſunder in rows two feet diſtant from each other. They ſhould not be eaten before the froſt has rendered them tender; for till then they are tough and bitter. The Siberian broccoli, which is extremely hardy, never injured by cold, and always ſweeter in ſevere winters, than in mild ones, need not be ſown till the beginning of July, and when its plants are ſtrong enough for removing, that is to ſay, when they have about ſix or eight leaves, they ſhould likewiſe be ſet in rows. The diſtance of a foot and an half, or perhaps rather two feet again, between the rows, may be ſufficient here. Theſe will be fit for uſe ſoon after Chriſtmas, and continue good till April. The ſoil for broccoli ſhould be a good, freſh, deep looſened earth. The manner of ſowing, tranſplanting, and cultivating of it, is the ſame as for cabbage, like which the new ſet plants of broccoli ſhould be watered every other evening till they have taken freſh root. The common way is then to draw the earth up around their ſtems with a hoe, to keep the ground moiſt about them, and thereby ſtrengthen the plants: but good digging, deep hoeing, and frequent ſtirring of the earth between them, according to the principles of the new huſbandry, will anſwer all theſe ends much better, and make the plants proſper greatly more.

Broccoli requires a good and pretty deep ſoil, rather light than otherwiſe. The proper time for ſowing it is from the latter end of April to the beginning of June; and the manner the ſame as for cabbage. When the plants are about a fortnight or three weeks old, that is to ſay, when they have got ſeven or eight leaves, they ſhould, as hath been obſerved, like all others of the cabbage kind, be tranſplanted into beds of well prepared mould, and toward the end of July they will be fit to replant where they are to remain. This ſhould be in a well ſheltered ſpot, but not under the drip of trees. The plants ſhould here be ſet in rows at leaſt two feet aſunder (but two feet and an half, or even three feet, will be yet better), and at the diſtance of a foot and an half, or rather two feet, from each other in the rows. Towards the end of December, if the weather is not very ſevere, they will begin to ſhew their ſmall heads, which, eſpecially at their firſt appearance, are not unlike to cauliflowers. Theſe heads ſhould be cut off before they run up to ſeed, with about four or five inches of the ſtalks, and a great number of ſide ſhoots, produced from the ſtem, will ſucceed them, and continue fit for eating till the middle of March. They will not indeed be ſo large as the former, but they will be full as well taſted.

The Roman or purple broccoli, the Naples or white broccoli, and the brown or black broccoli, are the ſorts cultivated in the kitchen garden. The former of theſe is the beſt flavoured, and continues longeſt in ſeaſon; for which reaſon it is the moſt eſteemed. The white broccoli taſtes ſo like the cauliflower, that it is not always eaſy to diſtinguiſh them. The brown or black ſort is the leaſt delicate; but it is the hardieſt, and grows to the largeſt ſize.

For a ſecond crop, to ſupply the table after the firſt is gone, Mr. Miller adviſes the ſowing of broccoli again in the beginning of July: but Mr. Switzer thinks it wrong to ſow this plant even ſo late as Midſummer; "becauſe, ſays he, its ſtems will not be ſtrong enough "before the winter to produce that number of ſprouts "which otherwiſe they would." He therefore prefers portioning out the plants into three parts, and cutting their heads off entirely within a foot and an half, or two feet, of the ground; beginning to do this to one parcel about a fortnight before Michaelmas, to the next about a month after, and to the laſt about a fortnight or three weeks before Chriſtmas; by which means a continued ſucceſſion of ſprouts will iſſue from the ſides of their remaining ſtems. Mr. Miller's method here will produce the largeſt heads, and Mr. Switzer's the greateſt number of ſmall ones.

The common practice of earthing up the ſtems of the broccoli plants from time to time, cannot be near ſo beneficial as frequent deep digging and ſtirring of the ground between them, according to the principles of the new huſbandry. Many remarkable inſtances might be mentioned of the advantage of this culture applied to cabbages, of which this is a ſpecies.

The ſeeds of broccoli are ſaved in the ſame manner as thoſe of the common cabbage; or if there be any difference, it is in regard to the white broccoli, of which it is beſt to reſerve a few of the largeſt heads of the firſt crop, and let them run up to ſeed, carefully ſtripping off all the under ſhoots, ſo as to leave only the main ſtem. If this is duly obſerved, and no other ſort of cabbage is ſuffered to run up near them, the ſeeds of the white broccoli will be obtained as perfect here, as any that are imported from abroad; nor will the plants produced by them degenerate in many years. *Mills's Huſbandry.*

BROCK, among ſportſmen, a term uſed to denote a badger.

A hart too of the third year is called a brock, or brocket; and a hind of the ſame year, a brocket's ſiſter.

BROKEN-BACKED, amongſt ſeamen, a ſhip is ſaid to be ſo, when either by age or ſome great ſtrain ſhe is ſo weakened in the keel and midſhip frame as to droop at both ends. See Keel.

BROKER, a name given to perſons of ſeveral and very different profeſſions, the chief of which are exchange-brokers, ſtock-brokers, pawn-brokers, and brokers, ſimply ſo called, who ſell houſhold furniture, and ſecond-hand apparel.

BRONCHIA, in anatomy, the ramifications of the trachea.

The bronchia, in their origin, are formed of imperfect annuli, and in their progreſs of cartilaginous and membraneous fruſtæ, very curiouſly connected and joined together. Theſe have their origin from the trachea; and after being ſubdivided into innumerable ramifications, finally terminate in thoſe ſmall veſicles which form the greater part of the ſubſtance of the lungs. Theſe veſicles have interſtices all the way between them, and adhere, as it were, to the branches of the bronchia, in the manner of cluſters of grapes. See the article Lungs.

The word is Greek, βρογχια, which ſignifies the ſame thing.

BRONCHIAL Artery, a veſſel allotted to the nutrition of the lungs.

It riſes ſometimes ſingle, ſometimes double, ſometimes triple, from the aorta and intercoſtals, and adheres every where firmly to the bronchia.

Bronchial-Vein ariſes either from the intercoſtals, or from the vena azygos; accompanies the artery, and divides into the ſame number of branches with it. As the artery brings blood to the bronchia for the nutrition thereof, and of the veſicles of the lungs, ſo the vein carries off the blood again to the cava, where it ſoon terminates.

BRONCHOCELE, in ſurgery, a tumour ariſing in the anterior part of the neck, from the reſiſting flatus or air, ſome humour or other violence, as ſtraining in labour, lifting of weights, &c.

The word is formed from the Greek, βρογχος, the wind-pipe, and κηλη, a tumour.

This diſorder with us is frequently called a Derby-neck, on account of the inhabitants of that county being much ſubject to it; probably for the ſame reaſons that the inhabitants about the valleys of the Alps, and other mountainous countries, are ſo much affected with it; namely, the air or waters of the country. But it has not been yet explained in what manner they operate to produce theſe effects. This tumour, when once become inveterate, is very difficultly, if ever, curable by medicines; but may be diſperſed, if it is recent. A leaden collar, mixed with mercury, prevents it from growing bigger, if it does not entirely diſperſe it. Some adviſe to rub it well with the hand or a bone of a dead man, and other direct to other ſuperſtitious means; but the moſt celebrated remedy is one that is ſold at Coventry, and kept a ſecret by the preparer. It is ordered to be laid under the tongue every night upon going to bed.

BRONCHOTOMY, in ſurgery, an inciſion made in the aſpera arteria, or wind-pipe, which is neceſſary in many caſes, and eſpecially in a violent quinſey, to prevent ſuffocation from the great inflammation or tumour of the parts. It is alſo called laryngotomy and tracheotomy.

The word is formed from the Greek, βρογχος, the wind-pipe, and τεμνω, to cut.

There are ſeveral methods of performing this operation; but that which exceeds the reſt, as being moſt eaſy and expeditious, and occaſioning the leaſt wound and pain to the patient, is by an inſtrument conſiſting of a ſmall tube, in which is contained a triangular needle called a trochar. This inſtrument is ſo managed, as to paſs through the middle of the trachea by one puſh; and after drawing out the needle from the tube, the latter is left in the wound, till the patient recovers. Bronchotomy ſhould be performed in time, while there is ſufficient ſtrength and hopes of the patient's recovery; for when the patient is ſpent, it is uſually performed in vain. If a drowned perſon has but juſt expired, or not continued long under water, the moſt certain and expeditious way of recovering him, will be by opening the trachea with ſuch inſtrument as is neareſt at hand, and afterwards to inflate or blow into his lungs either with the naked mouth, or with a tube.

BRONCHUS, βρογχος, in anatomy, the aſpera arteria, or wind-pipe, which reaches from the larynx to the lungs.

BRONTIÆ, *Thunder-Stones*, in natural hiſtory, the ſame with the belemnitæ. See the article BELEMNITES.

BRONTIUM, βροντειον, in Grecian antiquity, a place underneath the floor of the theatres, in which were kept brazen veſſels full of ſtones and other materials, with which they imitated the noiſe of thunder.

BRONTOLOGY denotes the doctrine of thunder, or an explanation of its cauſes, phænomena, &c. together with the preſages drawn from it. See THUNDER.

The word is formed from the Greek, βροντη, thunder, and λογος, a diſcourſe.

BRONZE, a compound metal, two thirds of which conſiſts of copper, and one third of braſs.

BRONZING, the act of colouring by metalline powders, plaſter, or other buſts and figures, in order to make them appear as if caſt of bronze, copper, or other metals.

This is ſometimes done by means of cement; and ſometimes without, in the inſtance of plaſter figures: but the bronzing is more durable and ſecure when a cement is uſed.

The gold powders, and the aurum moſaicum, are frequently employed for this purpoſe; but the proper bronzing ought to be of a deeper and redder colour, more reſembling copper; which effect may be produced by grinding a very ſmall quantity of red lead with theſe powders; or the proper powder of copper may be uſed: and may be prepared as follows.

Take filings of copper or ſlips of copper-plates, and diſſolve them in any kind of aqua-fortis put into a glaſs receiver, or other proper formed veſſel. When the aqua-fortis is ſaturated with the copper, take out the ſlips of the plates, or, if filings were uſed, pour off the ſolution from what remains undiſſolved: and put into it ſmall bars of iron; which will precipitate the copper from the aqua-fortis in a powder of the proper appearance and colour of copper. Pour off the water from the powder; and waſh it clean from the ſalts, by ſeveral ſucceſſive quantities of freſh water.

Where the appearance of braſs is deſired, the gold powders, or the aurum moſaicum, may be mixed with a little of the powder called argentum muſivum.

Where no cement is uſed in bronzing, the powder muſt be rubbed on the ſubject intended to be bronzed, by means of a piece of ſoft leather, or fine linen rag, till the whole ſurface be coloured.

The old method of uſing a cement in bronzing was, to mix the powders with ſtrong gum water, or iſinglaſs ſize; and then with a bruſh, or pencil, to lay them on the ſubject; but the artiſts at preſent uſe the japanners gold ſize: and proceed in all reſpects in the ſame manner as in gilding with the powders in other caſes. See GILDING.

This is the beſt method hitherto practiſed; for the japanners gold ſize binds the powders to the ground, without the leaſt hazard of feeling or falling off; which is liable to happen when the gum water, the glovers, or iſinglaſs ſizes are uſed: though, notwithſtanding the authority of the old practice for the contrary, even theſe cements will much better ſecure them when they are laid on the ground, and the powders rubbed over them, than when both are mixed together, and the effect particularly of the aurum moſaicum will be much better in this way than the other.

The fictitious ſilver-powder, called the argentum muſivum, may be applied in the ſame manner as bronze, by thoſe whoſe caprice diſpoſes them to ſilver figures or buſts: but all ſuch kind of ſilvering is much better omitted; as the whiteneſs itſelf is injurious to their right effect, by its eluding the judgment of the eye, with reſpect to the proper form and proportion of the parts, from the falſe and pointed reflections of the lights, and the too faint force of the ſhades; and probably the deſire of removing that inconvenience was the firſt inducement to bronzing.

BROOK-LIME, in botany, the Engliſh name of the water anagallis. See ANAGALLIS.

BROOM, *Geniſta*, in botany. See the article GENISTA.

Many gather the yellow buds of this plant, and pickle them with ſalt and vinegar, in the ſame manner as capers, from which they are not then to be diſtinguiſhed; the flowers are moſt in uſe, and are accounted ſplenetic, nephritic, and hepatic.

Broom is extremely pernicious to arable and paſture lands; and therefore ought, by all means, to be rooted up, which is the only method of killing it. On barren grounds, indeed, it is a good improvement; for beſides its uſe as fuel, it makes an excellent and laſting thatch, if well laid on.

Butcher's BROOM, the Engliſh name of a genus of plants, called by botaniſts ruſcus. See RUSCUS.

Spaniſh BROOM, in botany, the Engliſh name of the ſpartium. See SPARTIUM.

BROOM-LIME, in botany, the Engliſh name of the veronica. See VERONICA.

BROOM-RAPE, the orobanche of botaniſts. See OROBANCHE.

BROW, or EYE-BROW, the hairy arch extended over the orbit of each eye.

BROW-ANTLER, among ſportſmen, that branch of a deer's horn next his head.

BROW-POST, among builders, the beam that goes acroſs a building.

BROWN, among painters, dyers, &c. a duſky colour, with a reddiſh caſt. There are a great variety or degrees of this colour, diſtinguiſhed by different appellations.

The principal brown colours known among painters are Spaniſh brown, brown pink, biſtre, brown okre, umbre, aſphaltum, and Spaniſh juice, or the extract of liquorice. See each under its proper article. But it muſt be remembered, that a brown colour of any tinct deſired may be procured by a judicious mixture of red, blue, and yellow.

The method of dying browns is, by entering the cloth in a boiling bath of braſil and nut galls; after it has boiled an hour and a half, it is taken out, cooled, and aired; and then entered again in the ſame bath, after a proportional quantity of copperas has been added. The ſadder you would have your brown, the larger muſt be the proportion of copperas.

BROWNISTS, in eccleſiaſtical hiſtory, a religious ſect that ſprung up in England towards the end of the ſixteenth century. Their leader was one Robert Brown, a native of Northampton. They ſeparated from the eſtabliſhed church on account of its diſcipline and form of government. They equally diſliked epiſcopacy and preſbyterianiſm. They condemned the ſolemn celebration of marriages in churches, maintaining that matrimony being a political contract, the confirmation of it ought to proceed from the civil magiſtrate. They rejected all forms of prayer, and held that the Lord's prayer was not to be recited as a prayer, being given only as a model, upon which to form our prayers.

BRUMALIA, in antiquity, were feſtivals of Bacchus, celebrated twice a year, the firſt on the twelfth of the calends of March, and the other on the eighteenth of the calends of November. They were inſtituted by Romulus, who during theſe feaſts uſed to entertain the ſenate.

BRUTE, an animal without the uſe of reaſon, or that acts by mere inſtinct, in which ſenſe it implies much the ſame with beaſt, and comprehends all animals, except the human ſpecies.

Philoſophers are however far from being agreed on this ſubject; ſome making them mere machines, while others raiſe them to a level with mankind, and allow them both reaſon and immortality. Perhaps thoſe come neareſt the truth, who, by taking a middle courſe, avoid the two extremes, and allow brutes to have imagination, memory, and paſſion; but deny that they have underſtanding or reaſon, at leaſt in any degree comparable to that of mankind.

BRYONIA, bryony or wild-vine, in the materia medica, a perennial rough plant, growing wild in hedges, and climbing on the buſhes with curled tendrils. The leaves are in ſhape ſomewhat like thoſe of the vine, irregularly pentagonal, with a conſiderable indentation between every two angles, and the extreme ſegment longeſt: in their boſoms come forth cluſters of greeniſh-white bell-ſhaped monopetalous flowers, divided into five roundiſh ſections, adhering firmly to the cup; ſucceeded by red berries, containing an extremely viſcid pulp with ſmall ſeeds. The root is very large, ſometimes as thick as a man's thigh, of a yellowiſh or browniſh colour on the outſide, and white and fungous within.

Freſh bryony root, taken up in the beginning of ſpring, abounds with a thin milky juice: if the upper part of the root be bared of earth, and the top cut over tranſverſely, the juice continues to riſe gradually to the ſurface, in notable quantity, for two or three days ſucceſſively, and may be collected by forming a cavity in the middle to receive it. Both the root in ſubſtance, and the juice, have a diſagreeable ſmell, and a nauſeous, bitter, biting taſte: applied for ſome time to the ſkin, they inflame or even veſicate the part. On drying the one, or inſpiſſating the other, they loſe moſt of their acrimony, and nearly the whole of their ill ſcent. In ſummer, the root proves much leſs juicy, and weaker both in ſmell and taſte.

This root, taken in powder from a ſcruple to a dram, proves a ſtrong cathartic. It was formerly given, both as a purge, in maniacal and hydropic caſes; and in ſmaller doſes, as a reſolvent and deobſtruent, in uterine and aſthmatic diſorders, in which it is reported to have been of great efficacy. At preſent it is, in this country, very rarely made uſe of in either intention; on account, not entirely of the violence of its operation, for purgatives as violent as it are ſtill retained in practice, but partly of its degree of activity in different ſtates and forms, being very variable, and leſs aſcertained than that of other cathartics in more general uſe. It is ſaid, that when freſh it operates violently upwards as well as downwards; and that when dry, it acts with leſs violence, and chiefly by ſtool: that the juice, which iſſues from it ſpontaneouſly, purges mildly in doſes of a ſpoonful; that the freſh root, bruiſed and freed from its liquid by preſſure, and afterwards dried, is ſtill purgative; and that the expreſſed juice exſiccated, and the farinaceous fecula which ſubſides from it on ſtanding, are of little activity: that an extract made from the freſh root, by boiling it in wine, and preſſing out and inſpiſſating the decoction, operates with ſufficient mildneſs, in doſes of from half a dram to a dram, both by ſtool and urine; and that infuſions in water are chiefly diuretic. Burggrave relates, as from his own knowledge, a pretty remarkable account of the effects of the watery infuſion and juice in this laſt intention. From a freſh root, as thick as can be procured and about a ſpan long, he directs about an inch of the top to be cut off, and a large conical piece to be cut out to two thirds the depth of the root: into this cavity put two ounces or more of ſugar-candy in powder, above which inſert the cone properly detruncated, and ſet the root upright in a warm place for twenty-four hours: the ſugar being now diſſolved by the native juice of the bryony, the excavated part of the root is to be cut off, and one, two, or three ſlices, from the lower ſolid part, infuſed in water. Give, ſays the author, to an hydropic perſon, one ſpoonful of the ſaccharine ſolution in the morning, and repeat it every two hours till the patient begins to make water profuſely, for it will not purge: when great thirſt is complained of, give a draught of the infuſion, which will likewiſe not purge, but work ſtill more by urine: then carefully provide againſt any ill effects enſuing from the inanition of the abdomen and collapſion of the integuments.

Externally, the freſh root is employed in cataplaſms, as a reſolvent and diſcutient; againſt tumours, both of the ſcirrhous and œdematous kind, ſtagnations and coagulations of the blood from external injuries and iſchiadic and other rheumatic pains.

BRYUM, in botany, a genus of moſſes, conſiſting of a ſtalk furniſhed with leaves, which ariſe immediately from the root: on this ſtalk ſtands a ſeparate pedicle, with a conic capſule on its top, covered with a ſmooth operculum, and containing a fine powder.

BUBALUS, the buffalo. See BUFFALO.

BUBBLE, in philoſophy, a ſmall drop, or veſicle of any fluid filled with air, and either formed on the ſurface of the fluid, as in rain, &c. or in its ſubſtance, by an internal motion of its component particles.

Bubbles are dilatable and compreſſible; that is, they take up more or leſs ſpace, as the included air is more or leſs heated, or more or leſs preſſed externally: becauſe the included air acts equally in every direction. Their coat is formed of minute particles of the fluid, retained by the attraction between thoſe particles.

BUBBLE, in commerce, a cant term given to a kind of projects for raiſing money on imaginary foundations, much practiſed in France and England in the years 1719, 1720, and 1721.

BUBO, or BUBOE, in ſurgery, a tumour which ariſes, with inflammation, only in certain or particular parts to which they are proper, as in the arm-pits and in the groins. See the article TUMOUR.

The diviſion of a bubo is generally two-fold, the benign and the malignant: a bubo is ſaid to be benign, when it ariſes ſpontaneouſly, without any preceding contagious and peſtilential diſeaſe, as they frequently do in infants: thoſe are alſo of this kind which come after benign fevers, being a critical diſcharge of the diſeaſe, and therefore commonly termed peſtilential or venereal buboes.

With regard to the cauſes of benign buboes, they take their riſe from an inſpiſſation and obſtruction of the blood; ſo that they differ from other inflammations, only in the particular part where they are ſeated.

In buboes, which are unaccompanied with any other diſeaſe, the frequent taking of ſome cathartic medicine, with an addition of mercurius dulcis is found to be of great ſervice; other medicines, which attenuate the blood, ſhould be alſo uſed. When the inflammation is ſo gentle, as to give hopes of diſperſion, it may be proper to apply diſcutient plaſters externally, as *emplaſt. diachyl. ſimplex, de ſpermate ceti, de galbano, &c.*

But if the inflammation proves more violent, the pains more intenſe, and the diſcutient plaſters avail nothing, it will be proper to bring it to ſuppuration, by the application of emp. diachylon, cum gummis, or ſomething as effectual. If violent pains alſo affect the patient, the frequent application of digeſting cataplaſms warm to the part, will not only mitigate the pain, but alſo greatly promote a diſperſion, or elſe a digeſtion and maturation.

Peſtilential BUBOES are diſtinguiſhable from other tumours, by their happening at a time, and in conjunction with the plague, and from their being accompanied, in the patient, with the ſymptoms proper to that diſtemper: theſe tumours are ſometimes joined with carbuncles.

It is not without reaſon affirmed by ſome of the more learned and modern phyſicians, that almoſt the whole buſineſs of curing the plague conſiſted in carefully promoting the eruption of buboes. The patient, upon the firſt appearance of the tumours, ſhould keep the houſe, or rather keep in a warm bed, to be more ſecure from the air.

In the external treatment, it is very ſerviceable to rub the tumified part pretty ſtrongly with the hands or cloths; and, what is ſtill preferable, to apply external maturative and emollient medicines, whereby they will come out the ſooner; the patient will alſo find great benefit from the uſe of a cataplaſm, made *ex fermento panis callido, vel ſolo, vel cum ſale atque ſinapi contrito.* To the external applications, it will be proper to join internal medicines, by the help of which the venom, lurking in the body, may be expelled in a gentle ſweat; but ſuch ſudorific medicines as are very ſtrong and heating, have been always found dangerous and pernicious by modern phyſicians. In ſome caſes, the tumour turns ſuddenly to ſuppuration, and in others it remains for ſome weeks, without being any thing ſofter. When this is the caſe, it is neceſſary to continue the uſe of the forementioned remedies, till the tumour either breaks of itſelf, or is fit to be opened, like other abſceſſes, by inciſion with the ſcapel, that the peſtilential matter may be diſcharged, and prevented from returning into the blood.

Venereal Bubo, a tumour with pain and inflammation, ariſing in the groin or arm-pits, after contact with an impure woman, who is afflicted with the venereal diſeaſe. The moſt certain ſigns of buboes being venereal are, the patients having to do with theſe women, and from their being, and having been, accompanied with gonorrhæas, chancres, or other ſymptoms of the venereal diſeaſe. With regard to the cure, there are many phyſicians who hold, that the diſperſion of venereal buboes are equally improper as in the peſtilential; they therefore judge it neceſſary to abſtain entirely from bleeding, purging, and to forward the tumour to ſuppuration as faſt as poſſible: however, others are for taking cathartic and mercurial medicines, together with a decoction of the woods, and other purifiers of the blood. The diſperſion is to be effected with large doſes of mercurius dulcis, as is uſual in carrying off gonorrhæas.

Externally to the tumour ſhould be applied ſome diſcutient plaſters, as thoſe in the peſtilential tumours: the patient ſhould keep a regular diet and courſe of life, and ſhould abſtain from ſtrong liquors.

The ſuppuration is to be promoted much in the ſame manner as mentioned in the benign and peſtilential tumour.

The internal medicines ſhould be a decoction of the woods, two or three times a day, from eight to twelve ounces at a time, with thirty or forty drops of eſſent. lignor. pimpinellæ, albæ fumariæ, &c. It is to be opened as the peſtilential bubo.

BUBONOCELE, or Hernia Inguinalis, in ſurgery, a tumour in the inguen, formed by a prolapſus of the inteſtines, omentum, or both, through the proceſſes of the peritonæum, and rings of the abdominal muſcles.

The bubonocele may ariſe from two cauſes, viz. a relaxation of the peritonæum and rings of the abdominal muſcles, or ſome violent contraction and preſſure of the abdominal muſcles upon the inteſtines, as in jumping, lifting of great weights, coughing, hollowing, blowing a trumpet, riding on horſe-back, a fall, &c.

When this diſorder is formed inſenſibly, and by degrees, it is attended with but few and ſlight ſymptoms: when it ariſes from violent colds, exerciſes, eating too plentifully of groſs and flatulent food, which will exaſperate the diſorder, the conſequence will be violent pain and inflammation, ſickneſs, vomiting, and the iliac paſſion. It may be farther diſcovered from the tumour occaſioned thereby in the groin, which proceeds up to the ring of the abdominal muſcles; and when the inteſtine is not incarcerated, but returnable into the abdomen, the tumour ſubſides upon lying down. When the bubonocele is incarcerated, ſo that the parts forming the tumour are not returnable into the abdomen, it uſually appears with a greater reſiſtance to the touch, redneſs, and inflammation.

Theſe ruptures are often attended with danger, eſpecially the incarcerated ones, in which, if the inteſtine be not timely returned, but the ſtricture continues two or three days, red and livid ſpots appear upon the tumour, which denote a ſphacelus or mortification; and if an univerſal cold ſweat ſeizes the patient, he has generally but a few hours to live. When the omentum alone falls down, there is leſs danger than when it is accompanied with the inteſtines.

When the inteſtine is returnable, the patient ſhould be laid on his back, with his thigh a little bent, to relax the integuments; then the tumour is to be gently preſſed, or returned with the hands and fingers, after which a plaſter and compreſſure are to be applied to the part affected, and retained with a proper truſs, and a girdle or bandage, without taking them off for ſeveral months, or longer, as there is occaſion. See the article Truss.

When the inteſtine is not returnable, then the operation of inciſion becomes abſolutely neceſſary, in order to dilate the parts. However, the ſurgeon may firſt try the repeated uſe of cataplaſms, ointments, and laxative clyſters, after bleeding; whereby the ſtricture is ſometimes removed, and the inteſtine may be returned by the finger, without much difficulty.

BUCARDIA, or Bucarditæ, in natural hiſtory, a kind of figured ſtones, formed in the cavities of the larger cockles, and thence neceſſarily reſembling, in ſome meaſure, a heart at cards.

BUCCAL, *Buccalis*, ſomething belonging to the cheeks: thus the buccal glands are thoſe diſperſed over the inner ſide of the cheeks.

BUCCANEERS, thoſe who dry and ſmoke fleſh or fiſh, after the manner of the Americans.

This name is particularly given to the French inhabitants of the iſland of St. Domingo, many of whom hunt bulls or wild boars, in order to ſell the hides of the former, and the fleſh of the latter.

The buccaneers are of two ſorts: the buccaneers ox hunters, or rather hunters of bulls and cows; and the buccaneers boar-hunters, who are ſimply called hunters; though it ſeems, that ſuch a name be leſs proper to them than to the former; ſince the latter ſmoke and dry the fleſh of wild boars, which is properly called buccaneering, whereas the former prepare only the hides, which is done without buccaneering.

Buccaneering is a term taken from Buccan, the place where they ſmoke their fleſh or fiſh, after the manner of the ſavages, or on a grate or hurdle, made of braſil wood, placed in the ſmoke, a conſiderable diſtance from the fire: this place is a hut, of about twenty-five or thirty feet in circumference, all ſurrounded and covered with palmetto leaves.

Buccaneers alſo ſignify thoſe famous adventurers of all the nations in Europe, who formerly joined together to make war againſt the Spaniards of America, cruizing about in privateers, and taking all the veſſels and ſmall craft they could meet with.

BUCCELLARII, an order of ſoldiery under the Greek emperors, appointed to guard and diſtribute the ammunition bread; though authors are ſomewhat divided as to their office and quality. Among the Viſigoths buccellarius was a general name for a client or vaſſal who lived at the expence of his lord. Some give the denomination to paraſites in the courts of princes; ſome make them the body guards of emperors; and ſome fancy they were only ſuch as emperors employed in putting perſons to death privately.

BUCCINA, an ancient muſical and military inſtrument. It is uſually taken for a kind of trumpet, which opinion is confirmed by Feſtus, by his defining it a crooked horn, played on like a trumpet.

BUCCINATOR, in anatomy, a muſcle on each ſide of the face, common to the lips and cheeks. The origin of the buccinator is partly from the anterior and lower part of the coronoide proceſs of the lower jaw, and partly about the roots of the poſterior dentes molares of both jaws. Its progreſs, as the head is erect, is nearly horizontal; its termination is at the angle of the lips. Its uſes are to bring the food into the way of the teeth;

and the ſalival duct of Steno perforates it in the middle.

BUCCINUM, the TRUMPET-SHELL, a genus of univalve ſhells, ſhaped in ſome degree like a horn, or other wind-inſtrument: the belly of the ſhell is diſtended, the aperture of the mouth is large, wide, and elongated, the tail is more or leſs long, and the clavicle more or leſs contorted.

This is a very numerous genus, the principal ſpecies of which are the ſpindle-ſhell, the mitre-ſhell, the tower of Babel-ſhell, &c.

BUCENTAUR, a galeas, or large galley of the doge of Venice, adorned with fine pillars on both ſides, and gilt over from the prow to the ſtern. This veſſel is covered over head with a kind of tent, made of purple ſilk. In it the doge receives the great lords and perſons of quality that go to Venice, accompanied with the ambaſſadors and counſellors of ſtate, and all the ſenators ſeated on benches by him. The ſame veſſel ſerves alſo in the magnificent ceremony of Aſcenſion-day, on which the doge of Venice throws a ring into the ſea to eſpouſe it, and to denote his dominion over the gulf of Venice.

BUCENTAUR is alſo the name of a ſhip, as great and as magnificent as that of the Venetians, built by order of the elector of Bavaria, and launched on a lake which is ſix leagues in length.

BUCK, among ſportſmen, in his firſt year, is called a fawn; the ſecond, a pricket; the third, a ſorel; the fourth, a ſore; the fifth, a buck of the firſt head; and the ſixth, a great buck. This beaſt is common in moſt countries, being corpulent as a hart, but in ſize reſembling more a roe, except in colour; the males have horns, which they loſe yearly; the females none at all. As for the colour, it is very different; however, they are moſtly branded and ſandy, with a black liſt all along the back. Their fleſh is excellent nouriſhment.

BUCK-BEAN, in botany, the trifolium paluſtre, or marſh trefoil of authors.

BUCK'S-HORN-CRESS, the naſturtium of botaniſts. See NASTURTIUM.

BUCK-THORN, *Rhamnus*, a hedge tree or buſh, whoſe branches are full of long ſtiff thorns, and yellowiſh green leaves about as big as the ſloe-tree, but more neatly ſerrated about the edges. The flowers grow ſeveral together, being ſmall, four-leaved, and yellow, which are ſucceeded by little round black berries, yielding, when ripe, a purpliſh bitter juice, and having three or four angular ſeeds. It grows in woods and hedges, and flowers in June, the berries being ripe about the latter end of September.

The juice of the berries purges ſerous watery humours pretty briſkly; and is good againſt the dropſy, gout, jaundice, and ſcurvy, and very ſerviceable againſt the itch, and all manner of eruptions on the ſkin.

The berries of this tree are ordered by the college of phyſicians for medicinal uſe; but particularly for making a ſyrup, which was formerly in great uſe; but of late the perſons who ſupply the markets, have gathered ſeveral other ſorts of berries, which they have either mixed with thoſe of the buckthorn, or have wholly ſubſtituted them in their place. Theſe are the berries of the frangula, cornus ſœmina, &c. which mixture have ſpoiled the ſyrup, and rendered it leſs eſteemed. But whoever purchaſes the buck-thorn berries, may diſtinguiſh whether they are right or not, by opening them, and obſerving the number of ſeeds in each; for theſe have commonly four, whereas the frangula has but two, and the cornus ſœmina but one; as alſo by bruiſing of the berries on white paper, the juice giving a green tincture.

BUCK-WHEAT, the Engliſh name of the fago pyrum of authors; it is cultivated in many parts of England, and is a great improvement to dry barren lands. The beſt ſeaſon for ſowing the ſeed is in May: one buſhel will ſow an acre. The ground ſhould be plowed and dreſſed in the ſame manner as for barley; and, if the ſoil is not very lean, it will yield a very great increaſe, as fifty or ſixty buſhels upon an acre, and is excellent food for hogs, poultry, &c. The flour of it is very white, and makes a very good ſort of pancake, if mixed with a little wheat flour. The ſtraw is good fodder for cattle; and the grain, given to horſes among their oats, will make them thrive; but it muſt be broken in a mill; otherwiſe it is apt to paſs through the cattle whole.

It is commonly late in the ſeaſon before it is ripe; but there is no great danger of the ſeeds failing, nor of ſuffering by wet after it is mown: it muſt lie ſeveral days to dry, that the ſtalks, which are hard, may wither before it is houſed.

Buck-wheat is ſometimes ſown very thick, and ſuffered to grow until it is near flowering, and is then plowed in, which makes a very good lay for wheat or rye: but ſome people eſteem it the better way to feed cattle with it, eſpecially milch-cows, which they ſay will cauſe them to give a great deal of milk, and make both the butter and cheeſe very good. This will alſo afford food for cattle in the drieſt time, when all other graſs is burned up.

BUCKING *of Cloth*, among bleachers, the firſt operation or ſtep towards whitening of cloth. See the article BLEACHING.

BUCKLE, a well known utenſil, made of divers ſorts of metals, as gold, ſilver, ſteel, braſs, &c.

BUCKLER, a piece of defenſive armour uſed by the ancients, and worn on the left arm.

It was ſometimes compoſed of wickers woven together, ſometimes of light wood, and ſometimes of hides, ſtrengthened with plates of braſs or other metal.

The figure was either circular, oval, or ſquare; and generally adorned in the moſt curious manner with the figures of gods and heroes, or of birds, beaſts, or other productions of nature.

Votive BUCKLERS, thoſe conſecrated to the gods, and hung up in their temples as an offering to the gods.

BUCKRAM, in commerce, a ſort of coarſe cloth made of hemp, gummed, calendered, and dyed of ſeveral colours.

BUCOLIC, in ancient poetry, a kind of rural poem, relating to ſhepherds and rural affairs. See PASTORAL.

The word is formed from the Greek, βυκολος, an herdſman.

BUD, among gardeners, implies that part of a ſeed which firſt begins to ſprout, or rather the leaves which firſt appear.

BUD is alſo uſed to ſignify the ſprout from whence the branch ariſes.

BUDDLE, in minerology, a name given by the Engliſh dreſſers of the ores of metals to a ſort of frame made to receive the ore after its firſt ſeparation from its groſſeſt foulneſs.

The ore is firſt beaten to powder in wooden troughs, thro' which there runs a continual ſtream of water, which carries off ſuch of it as is fine enough to paſs a grating, which is placed at one end of the trough; this falls into a long ſquare receiver of wood, called the launder; the heavieſt and pureſt of the ore, falling at the head of the launder, is taken out ſeparately, and requires little more care or trouble; but the other parts, which ſpread over the middle and lower end of the launder, is thrown into the buddle, which is a long ſquare frame of boards, about four feet deep, ſix long, and three wide; in this there ſtands a man bare-footed, with a trambling ſhovel in his hand, to caſt up the ore about an inch thick, upon a ſquare board placed before him as high as his middle; this is termed the buddle-head; and the man dexterouſly, with one edge of his ſhovel, cuts and divides it longways, in reſpect of himſelf, about half an inch aſunder, in theſe little cuts; the water, coming gently from an edge of an upper plain board, carries away the filth and lighter parts of the prepared ore firſt, and then the metalline part immediately after, all falling down into the buddle, where, with his bare feet, he ſtrokes it and ſmooths it, that the water and other heterogeneous matter may the ſooner paſs off from it.

When the buddle by this means grows full, the ore is taken out; that at the head part, being the fineſt and pureſt, is taken out ſeparate from the reſt, as from the launder. The reſt is again trampled in the ſame buddle; but the head, or, as it is called, the forehead of this buddle, and of the launder, are mixed together, and carried to another buddle, and trampled as at firſt. The forehead of this laſt buddle, that is, that part of the ore which has fallen at the head, is carried to what they call a drawing buddle, whoſe difference from the reſt is only this, that it has no tye, but only a plain ſloping board, on which it is once more waſhed with the trambling ſhovel. Tin ore, when it is taken from this, is called black-tin; and this is found to be compleatly ready for the blowing-houſe. *Philoſ. Tranſ.* N°. 69.

BUDDLING, the act of cleanſing or waſhing any ore. See the article Washing.

Buddling-Dish, a ſmall, ſhallow veſſel for waſhing ores by the hand.

BUDGE-BARRELS, among engineers, ſmall barrels well hooped, with only one head; on the other end is nailed a piece of leather, to draw together upon ſtrings like a purſe. Their uſe is for carrying powder along with a gun or mortar, being leſs dangerous, and carried with more eaſe than whole barrels. They are likewiſe uſed on a battery of mortars, for holding meal powder.

BUFF, in commerce, a ſort of leather prepared from the ſkin of the buffalo, and dreſſed with oil after the manner of ſhammy. See Shammy.

BUFFALO, *Bubalus*, in zoology, an animal of the ox kind, with very large, crooked, and reſupinated horns.

It is equal to our largeſt oxen in ſize: the head is very large, the forehead remarkably broad, and the aſpect very fierce and terrible. The eyes are large and prominent, the ears long and patulous, the horns very thick but ſharp at the point: the neck is thick, and remarkably ſhort; the fleſh hangs very looſe under the throat: the body is more bulky in proportion than our bull, and the legs are thicker; but about equal in length. The colour is uſually a blackiſh grey; but in this particular there are great varieties.

The buffalo is a native of the Eaſt, but has been introduced into Italy, and ſome other parts of Europe; where it is kept as a beaſt of burden and draught.

BUFFET, a ſmall apartment ſeparated from the reſt of the room by ſlender wooden columns, glaſs doors, &c. for the diſpoſing china, glaſs, plate, &c.

BUFFOON, a droll, or mimic, who diverts the public by his pleaſantries and follies.

BUFO, the toad, in zoology; ſee Toad.

BUFONITÆ, in natural hiſtory, a kind of extraneous foſſils, otherwiſe called lycodontes, or wolf's teeth. See Lycodontes.

BUG, or Bugg, in zoology, the Engliſh name for a genus of inſects called by authors cimices. See Cimex.

Green-Houſe Bug, the coccus of the orange tree. See Coccus.

BUGGASINS, in commerce, a name given to buckrams made of callico.

BUGGERY. See Sodomy.

BUGLOSS, *Bugloſſum*, in the materia medica, a rough plant, greatly reſembling borage, and differing from it chiefly in the leaves being narrow, leſs prickly, not wrinkled, and in colour a bluiſh green; and in the ſegments of the flowers being obtuſe. It grows wild in waſte gardens, flowers from June to the end of ſummer; and in winter dies to the ground, the roots abiding.

This plant appears to be nearly ſimilar to borage, in its medicinal qualities as well as in its external form. The principal difference ſeems to conſiſt in the leaves being ſomewhat leſs juicy, and the roots more mucilaginous. The roots, leaves, and flowers, are ranked among the articles of the materia medica, but are very rarely made uſe of.

Viper's Bugloss. See Echium.

BUGULA, bugle, or middle confound, in the materia medica, a low plant, with two kinds of ſtalks; round creeping ones, which ſtrike root at the joints; and upright ſquare ones, hairy on two of the oppoſite ſides, alternately, from joint to joint, bearing looſe ſpikes of blue labiated flowers, of which the upper lip is wanting: the leaves are ſomewhat oval, ſoft, ſlightly cut about the edges, and ſet in pairs at the joints. It is found wild in woods and moiſt meadows, and flowers in May.

The leaves of bugle diſcover, on firſt chewing, a ſweetiſh taſte, which is followed by a conſiderable bitteriſhneſs and roughiſhneſs. Infuſions of them, or the expreſſed juice, are recommended as vulneraries, or as mild aſtringents and corroborants, in fluxes and other diſorders. Some have obſerved, that they do not bind the belly, like the other conſolidæ; but that, on the contrary, decoctions of them are gently laxative, and of great uſe in phthiſes and internal ulcerations. The roots of the plant are conſiderably aſtringent, as appears both from their taſte, and from their ſtriking a black colour with ſolution of chalybeate vitriol.

BUILDING, a fabric erected by art, either for devotion, magnificence, or conveniency.

Building is alſo uſed to ſignify the art of conſtructing and raiſing an edifice; in which ſenſe it comprehends the expences, as well as the invention and execution of the deſign.

Three things are chiefly neceſſary to be conſidered in the art of building, namely, conveniency, firmneſs, and pleaſure; and theſe Sir Henry Wotton conſiders under two heads, the ſituation, and the work.

As to the ſituation, either that of the whole is to be conſidered, or that of its parts. In the firſt, regard muſt be had to the quality, temperature, and ſalubrity of the air; to the quality of the ſoil; to the conveniency of water, fuel, carriage, &c. and to the agreeableneſs of the proſpect.

As to the ſituation of the parts, the chief rooms, ſtudies, and libraries, ſhould lie towards the Eaſt; thoſe offices which require heat, as kitchens, brew-houſes, bake-houſes, and diſtillatories, towards the South; thoſe that require a cool, freſh air, as cellars, pantries, and granaries, to the North; as alſo galleries for paintings, muſæums, &c. which require a ſteady light.

The ancient Greeks and Romans generally ſituated the fronts of their houſes towards the South; but the modern Italians vary very much from this rule. And indeed it is abſolutely neceſſary to have regard to the country, each being obliged to provide againſt its own inconveniences.

The ſituation being fixed on, the next thing to be conſidered is the work itſelf, under which come firſt the principal parts, and next the acceſſories or ornaments. To the principal parts belong the materials, and the form or diſpoſition.

As for the materials they are either ſtone, brick, mortar, &c. or wood, as fir, cypreſs; cedar for pillars for upright uſes; oak for ſummers, beams, and croſs work, or for joining and connection.

As to the form and diſpoſition of a building, it is either ſimple or mixed.

The ſimple forms are either circular or angular. The circular form is very commodious, and the moſt capacious of any, ſtrong, durable, and very beautiful; but is the moſt chargeable of all others, and much room is loſt by the bending of the walls, when it comes to be divided into apartments; beſides an ill diſtribution of the light, unleſs it be from the center of the roof. For theſe reaſons, the ancients employed this form only in their temples and amphitheatres, which had no need of compartitions.

As for angular forms, building neither loves many nor few angles. The triangle is condemned above all others, as wanting both capaciouſneſs and firmneſs, as alſo on account of its not being reſolvable, in the internal partitions, into any other figure than its own. Buildings with five, ſix, or more angles, are more fit for fortifications than civil edifices. The rectangle, therefore, is generally choſen, as being a medium between the triangle and the pentagon, &c. But then authors are in diſpute, whether the rectangle ſhould be an exact ſquare, or an oblong; and Sir H. Wotton prefers the oblong, provided the length exceeds not the breadth by more than one third. As to mixed forms, partly circular, and partly angular, a judgment may be made of them, from what has been already ſaid of ſimple ones. Let the builder, however, remember not to loſe ſight of uniformity, while he is in purſuit of variety; for theſe two may be very well reconciled, as may be obſerved in our bodies, which are uniform in the whole configuration; and yet ſome of the members are round, others flat; ſome prominent, and others indented, or retired.

Some obſerve, that in building houſes long, the uſe of ſome rooms will be loſt; as they will take up more for entries and paſſages, and will require too much for doors; and if the building be a geometrical ſquare, the middle rooms will want light, in caſe the houſe be pretty large; and therefore they recommend the form of the letter H, a form, ſay they, in which the building ſtands firmer againſt the weather, and in which the offices may be remote from the parlour and rooms of entertainment, and yet in the ſame houſe.

This figure may ſerve very well for a country gentleman's houſe.

The principal parts of a building are comprized, by Baptiſta Alberti, under five heads, viz. the foundation, the walls, the apertures, the compartitions, and the covering; ſee each under its proper article, as FOUNDATION, &c.

The acceſſories or ornaments of a building are fetched from ſculpture and painting. In the firſt, care ought to be taken that there be not too much of it, eſpecially at the entrance; and that both in fine and coarſe pieces of ſculpture, and likewiſe in placing figures aloft, the rules of perſpective be ſtrictly obſerved.

In painting, the chief things to be regarded are, that the beſt pieces be placed in the beſt lights; and that they be ſuited to the intention of the rooms they are uſed in.

If we compare the modern with the old way of building in England, we cannot but wonder at the genius of thoſe times. Our fore-fathers were wont to dwell in houſes, moſt of them with a blind ſtair-caſe, low ceilings, and dark windows; the rooms built at random, without any contrivance, and often with ſteps from one to another: whereas the genius of our times requires light ſtair-caſes, fine ſaſh-windows, and lofty ceilings, with conveniencies far ſuperior to thoſe that houſes in ancient days afforded upon an equal quantity of ground.

BUL, in the Hebrew chronology, the eighth month of the eccleſiaſtical, and the ſecond of the civil year; the modern Jews call it Morſhevan, and it nearly anſwers to our month of October.

BULB, or BULBOUS ROOT, among gardeners, ſignifies a root of a roundiſh figure, and uſually furniſhed with fibres at its baſe.

Bulbous roots are ſaid to be ſolid when compoſed of one uniform lump of matter; truncated, when formed of a multitude of coats ſurrounding each other; ſquamoſe, when compounded of, or covered with, leſſer flakes; duplicate, when there are only two to each plant; and congerate, when there is a congeries of ſuch roots to each plant.

BULBOCASTINUM, in botany; ſee BUNIUM.

BULBOCODIUM, in botany, a genus of plants, the flower of which conſiſts of ſix petals of a funnel form; the fruit is a triangular acuminated capſulæ, with three cells containing numerous ſeeds.

BULBOSE, or BULBOUS. See the article BULB.

BULGARIANS, a ſect of heretics, who, among other errors, held that men ought to believe no Scripture but the New Teſtament; that baptiſm was not neceſſary to infants; that huſbands who converſed with their wives could not be ſaved; and that an oath was abſolutely unlawful.

BULIMY, among phyſicians, a diſeaſe in which the patient is affected with an inſatiable deſire of eating, and unleſs indulged often falls into fainting fits.

A bulimy ariſes from a too contractile force of the muſcular coat of the ſtomach, or from very ſharp humours contained in it. In ſome the mouth of the ſtomach has been found too large, after death, and conſequently the aliment was expelled too ſoon.

In order to cure this diſeaſe, methods muſt be uſed to ſubdue the contractile force of the ſtomach, in which intention, oils, fat meats, milk, almonds, chocolate made with milk, and ſweetened with ſugar, will be found of ſervice. If theſe are not ſufficient, opiates muſt be added, particularly a dram of theriaca ſhould be given in the evening.

If the bulimy proceeds from a ſharp humour irritating the ſtomach, the moſt rational method of cure conſiſts in evacuating ſuch humour, or correcting its acrimony, and then reſtoring the ſtomach and organs employed in digeſtion, to their natural tone and ſtate, that no more may be generated.

BULK-HEADS, in naval architecture, certain partitions built up in different places of a ſhip, either acroſs or lengthwiſe, to form and ſeparate the various apartments.

BULL, *Taurus*, in zoology, the male of the ox kind. See the article BOS.

BULL, *Taurus*, in aſtronomy; ſee the article TAURUS.

BULL'S-EYE, in aſtronomy; ſee ALDEBARAN.

BULL'S-EYE, amongſt ſeamen, a piece of wood hollowed like a large ring, having the end of a rope ſpliced round the outer-edge of it, and another paſſing through the middle of it. Its uſe is to prevent the running rope from being chafed or fretted by the other, which confines it in a certain ſituation required.

BULL-FINCH, in ornithology, the Engliſh name of the loxia with a black head, and red breaſt. It is about the ſize of a common ſparrow; and its wings are elegantly variegated with black and red.

BULL-FROG, the largeſt kind of frog. See RANA.

BULL, among eccleſiaſtical writers, implies a written letter, diſpatched by order of the pope, from the Roman chancery, and ſealed with lead. It is written on parchment, by which it is diſtinguiſhed from a brief.

Golden BULL, an edict or imperial conſtitution, made by the emperor Charles IV. and eſteemed as the Magna Charta, or fundamental law of the German empire.

It is dignified with the epithet golden, from its having a golden ſeal appended to it with cords of red and yellow ſilk. On one ſide of this ſeal the emperor is repreſented ſitting on his throne, and on the other the capitol of Rome. The original of this edict, which is in Latin, and written on vellum, is preſerved at Franckfort.

BULLET, an iron or leaden ball, or ſhot, wherewith fire-arms are loaded. See the article BALL.

BULLION, uncoined gold or ſilver in the maſs.

Thoſe metals are called bullion, both before and after they are refined, when melted down in bars or ingots, or in any unwrought body.

BULTEL, a term uſed by millers to denote the refuſe of meal after dreſſing.

BULWARK, in ancient fortification, the ſame with which the moderns call rampart. See RAMPART.

BUNIUM, earth-nut, in botany, a genus of plants whoſe flower conſiſts of five inflexo-cordated equal petals. It has no pericarpium: the fruit is oval, and diviſible into two parts: the ſeeds are two, and of an oval form, convex on one ſide, and plane on the other.

BUNT, in naval affairs, the middle part of any ſquare ſail, from top to bottom; and hence

BUNTLINES are ſmall ropes paſſed up behind the yards, and running through a block or pully on the yard, reach down before their reſpective ſails; to the foot-rope or bottom of which they are faſtened in ſmall holes of the rope called cringles. Their uſe is to haul the bunt of the ſail cloſe up to the yard, when it is to be brailed up, or furled. See BRAIL and FURL.

BUNTING, in ornithology, the Engliſh name of the embezia. Its head reſembles, in ſome meaſure, that of a rail; the chin, breaſt, and belly, are of a yellowiſh white; the throat hath oblong black ſpots; the tail is about three inches long, and of a duſky red colour. It generally ſits and ſings upon the higheſt twigs of trees and ſhrubs.

BUOY, in naval affairs, a ſort of cloſe caſk or round block of wood, faſtened to the anchor by a rope of ſufficient length to reach up from the anchor, which is ſunk, to the ſurface of the water. It is uſed to ſhew where the anchor lies, that the ſhip may not come near it to entangle the fluke of it with her cable. See ANCHOR.

A buoy-rope is likewiſe extremely uſeful in drawing up the anchor, when the cable is broke. Buoys are alſo uſed to point out ſhallows, rocks, or quick-ſands; and are chained to anchors ſunk in ſuch places, that they may be avoided by ſhipping; theſe are generally very large, and ſhaped like a cone or ſugar-loaf, called can-buoys: thoſe uſed by ſhipping are wide in the middle, and taper to a point at each end, called nun-buoys. Streaming the buoy is letting it fall into the water with the buoy-rope, before the anchor is ſunk from the ſhip. To buoy up the cable is to faſten three or four buoys, or pieces of wood, to it, in different places, to keep it up from the ground when rocky or foul, and preſerve it from being cut or fretted.

BURDOCK, in botany, the Engliſh name of the xanthium of authors. See XANTHIUM.

BURGAGE, an ancient tenure in boroughs, whereby the inhabitants hold their lands, &c. of the king, or other ſuperior lord of the borough, at a certain yearly rent. A dwelling houſe in a borough was alſo anciently called a burgage.

BURGEON, a term uſed by ſome gardeners, in the ſame ſenſe as bud. See BUD.

BURGESS, an inhabitant of a borough, or a perſon who poſſeſſes a tenement therein.

BURGESS is now generally uſed to ſignify the repreſentative of a borough-town in parliament.

BURGGRAVE, properly denotes the hereditary governor of a caſtle or fortified town, chiefly in Germany.

BURGH-BOTE, a contribution towards the building or repairing of caſtles, or walls, for the defence of a borough or city.

BURGLARY, a felonious breaking and entering into the dwelling-houſe of another perſon, in the night-time, with an intent to commit ſome felony, whether the ſame be actually executed or not. The like offence committed by day is called houſe-breaking.

BURGOMASTER, the chief magiſtrate of the great towns in Flanders, Holland, and Germany.

BURIAL, the interment of a deceaſed perſon. See FUNERAL.

BURLESQUE, a jocoſe kind of poetry, chiefly uſed by way of drollery and ridicule, to deride either perſons or things.

Both the word and thing ſeem to be modern; though ſome maintain that one Raintovius, in the time of Ptolemy Lagus, turned the ſerious ſubjects of tragedy into ridicule: but, perhaps, this is a much better plea for the antiquity of farce than of burleſque.

Upon the whole, the Italians ſeem to have the juſteſt claim to the invention of burleſque. The firſt writer of this kind was Bernia, who was followed by Lalli, Caporali, &c. From Italy it paſſed into France, and became there ſo much the mode, that, in 1649, a book appeared under the title of, “The Paſſion of Our Saviour in Burleſque Verſe.” Thence it paſſed into England; but though one or two have excelled in this ſpecies of writing, the good ſenſe of the Engliſh never adopted or owned it.

BURN, in ſurgery, implies a ſolution of the continuity of a part of the body by the force of fire.

When either fire itſelf, or any inſtrument ſufficiently heated by the fire, is applied to any part of the body, the fibres and ſmall veſſels at the place of contact will inſtantly corrugate and burſt, while the blood and other contained fluids will be extravaſated, and there ſtagnate and corrupt.

But as burns are attended with conſequences proportioned to the vehemence of the fire, they may be divided into four degrees. The firſt and ſlighteſt is that which occaſions heat, pain, and a ſmall veſication of the injured part, in a ſhort time. The ſecond degree is when the part is inſtantly affected with prodigious pain and veſication. The third is when the common integuments and ſubjacent fleſh are ſo burnt, that they form a cruſt. The fourth is where every thing is deſtroyed quite down to the bone. The third degree reſembles a gangrene, and the fourth a ſphacelus: whence it follows, that burns very much reſemble inflammations, and are known in their reſpective degrees by nearly the ſame ſigns.

As a burn is not unlike an inflammation, in regard to degrees, ſo the method of cure in both is much the ſame. When there happens a ſlight burn, or one of the firſt degree, the moſt proper medicines, on all accounts, are reſolvents, of which there are two kinds principally to be obſerved, the aſtringent and the emollient. Mild aſtringents are ſpirit of wine rectified, or camphorated: let the part affected be immerged in this ſpirit, and carefully fomented with linen cloths wet therein. Emollients are of linſeed, or ſweet almonds, of olives, of white lilies, of henbane, &c. with theſe the part affected ſhould be frequently anointed. The vulgar method of applying the burnt part to a candle, or the fire, and keeping it in that poſition as long as you can bear it, repeating this proceſs till all ſort of heat and pain is removed, is frequently attended with ſucceſs. The injured part may be fomented with water, as hot as the patient can bear it, till the pain and heat entirely diſappear.

When the burn is of the ſecond degree, which is attended with a bliſter, it ſeems improper to open the veſicle, or cut the ſkin already lacerated; but the beſt method, in this caſe, is, with all the haſte poſſible, to apply one or other of the medicines preſcribed in the firſt degree, and renewing it very frequently: if the pain continues, lenitive remedies are to be uſed; here the moſt eligible medicines are the linſeed oil, Mynſicht's ointment, unguentum nutritum, &c. With theſe the part muſt be often anointed; or they muſt be ſpread on linen, and bound to the part affected: as the pain and heat gradually decreaſe, ſome plaſter, as that of red lead, may be applied, in order to ſmooth and reſtore the ſkin. If this ſecond degree be more intenſe than ordinary, and affects a great part of the body, it will be neceſſary forthwith to take away ſome blood, in proportion to the violence of the burn, even till the patient faints, in order to prevent exulcerations, deformities by ſeams, and perhaps a gangrene: after which a ſtrong cathartic ſhould be uſed.

As to the third degree, in which a cruſt immediately covers the burnt part, it is very difficult, if not abſolutely impoſſible, to cure it, without a ſuppuration. When this happens in the face, all diligence ſhould be uſed to prevent deformity, which may be occaſioned by a large cicatrix; therefore, in this caſe, the uſe of all plaſters and ointments whatſoever is to be avoided: but you cannot be too ſolicitous in forwarding the caſting off of the eſchar, or cruſt, and the evacuation of the matter that is concealed under it; yet it ſhould not be torn away with the knife, nor ſeparated with the hands: the eaſieſt and moſt ſucceſsful method is by the uſe of emollients, ſuch as have been mentioned already, applied warm, and repeated till the hard cruſts ſeparate from the live fleſh; the part ſhould be dreſſed two or three times a day, and at each dreſſing, if you ſhould obſerve any portion of the cruſt tending to a ſeparation from the reſt, it ſhould be removed with the forceps, and the remaining cruſt anointed with butter, at the ſame time never neglecting the uſe of fomentations. The cruſt being taken off, the wound muſt be cleanſed and healed, the firſt of which offices may be executed by any mild digeſtive ointment, mixed up with mel roſarum: the medicines uſed for healing are principally unguentum diapompholygos, vel de lithargyrio, &c. but if any portion of the eſchar is left under theſe ointments and plaſters, a danger follows of making a deformed cicatrix, from the conſtriction of the neighbouring parts, and from the acrimony of the confined ſanies. Evacuations by bleeding and purging are always to be premiſed, and proper regulations, with regard to diet, muſt be complied with: the beſt method of encouraging the renovation of the ſkin, is by frequently holding the burnt part over the ſteam that riſes from boiling water. But as to the fourth degree, which is always attended with extreme danger, where the burning has penetrated to ſuch a depth as to corrupt and mortify all before it, almoſt to the very bone, all remedies are vain and uſeleſs, and there is no other way of aſſiſting the patient, but by cutting off the affected limb, as is done in a ſphacelus.

BURNET, the Engliſh name of a plant called pimpinella by Linnæus, and tragoſelinum by Tournefort.

It is a native of this country, and promiſes very great advantages as a green ſucculent food for cattle during the winter months; and the judicious Mr. Rocque of obſerving that burnet retains its verdure amidſt all the inclemencies of that ſeaſon, reſolved to try the effect of giving it a good culture. He has ſucceeded therein to his utmoſt wiſh; and the plant bids fair to be of ſingular utility, where flocks of ſheep are kept, becauſe, as it preſerves all its leaves unhurt by froſt, the farmer may thereby have a conſtant ſtock of green food for his ewes and lambs, at a time when turnips and every other ſucculent plant may fail him.

In deſcribing this plant, Mr. Miller diſtinguiſhes ſeven different ſpecies of it; but only three, or perhaps rather but two, of them ſeem to be the ſorts proper to be cultivated for the food of cattle. Theſe are; 1. The tragoſelinum majus, umbella candida, greater burnet ſaxifrage, with a white umbel. 2. Tragoſelinum alterum majus, another greater burnet ſaxifrage; and 3. The tragoſelinum minus, or leſſer burnet ſaxifrage. All theſe are equally hardy plants, and natives of this iſland: but the largeſt ſorts promiſe the greateſt quantity of fodder, and therefore ſhould, probably, be preferred by the huſbandman. A fourth ſort, which Mr. Miller mentions by the title of tragoſelinum radice nigra Germanicum, German burnet ſaxifrage with a black root, will probably anſwer as well in its native country, Germany, as ours will here: and I therefore recommend the trying of it there; as I do to other countries, the cultivating of their native ſpecies of this plant, in full confidence that they will find it anſwer greatly for the winter green food of their cattle. Experience has proved that all countries are benefited by the introduction of foreign plants, as particularly the lucerne, ſaintfoin, &c. I therefore take this opportunity of recommending a trial of the German burnet here, and of ours in Germany and elſewhere.

The firſt of the above-mentioned ſpecies of burnet grows naturally in woods, and on the ſide of banks near hedges, in ſeveral parts of England. The lower leaves of this ſort are winged, and compoſed of three pair of heart-ſhaped lobes, terminated by an odd one: they are ſharply ſawed on their edges, and ſit cloſe to the mid-rib. The lower lobes, which are the largeſt, are near two inches long, and one and a half broad at their baſe, and are of a dark green. The ſtalks grow more than a foot high, dividing into four or five branches; the lower part of the ſtalk is garniſhed with winged leaves, ſhaped like thoſe at the bottom, but ſmaller; thoſe upon the branches are ſhort and trifid; and the branches are terminated by ſmall umbels of white flowers, which are compoſed of ſmaller umbels or rays. The flowers have five heart-ſhaped petals which turn inward, and are ſucceeded by two narrow, oblong, channelled ſeeds. It flowers in July, and the ſeeds ripen in autumn. A variety of this with red flowers is frequently found among the other, and riſes from the ſame ſeed.

The ſecond ſort grows naturally in dry paſtures in many parts of this iſland. The lower leaves of this are compoſed of four pair of lobes, terminated by an odd one; theſe are roundiſh; thoſe on the lower part of the leaf are about half an inch long, and the ſame in breadth: they are indented on their edges. The ſtalks riſe near a foot high, and ſend out three or four ſlender branches, which are garniſhed with very narrow leaves. The umbels of the flowers of this are ſmaller than thoſe of the former ſort, as are alſo the flowers and ſeeds, which blow and ripen about the ſame time.

The third, or ſmaller ſort of burnet grows naturally in dry gravelly paſtures in ſeveral parts of this country. Its lower leaves have five or ſix pair of lobes terminated by an odd one, and are deeply cut almoſt to their mid-rib, in form of wings. The ſtalks are ſlender, and riſe about a foot high, ſending out a few branches which have a narrow trifid leaf placed at each joint, and are terminated by ſmall umbels of white flowers compoſed of ſeveral rays ſtanding upon pretty long foot-ſtalks. The flowers of this ſort appear, and its ſeeds ripen, at the ſame time as thoſe of the former; but they are ſmaller.

In the meadows about Windſor, half the graſs is burnet. M. Rocque has experienced, that it will grow in the drieſt land: for he has planted ſome of it even in the gravel walks in his garden, where every thing elſe is burnt up in the ſummer; but this never withers; one of the qualities of burnet being to continue in ſap all the year. It is the opinion of many who have ſeen the burnet of his raiſing, that if this plant is generally cultivated, there will never be a ſcarcity of hay in England, even in the greateſt drought.

The land on which it is ſown ſhould be in fine tilth, and free from weeds, eſpecially couch-graſs, which is here the moſt hurtful of all. A drag, that is to ſay, ſuch a fork as the gardeners clean their aſparagus with, is the beſt inſtrument for extirpating this weed. The dragging of an acre thus will coſt ſix or ſeven ſhillings. If the land is poor, it ſhould be dunged, and laid down very ſmooth. The ſeed may be covered with a very light harrow, for it will not bear to be buried deep, and the ground ſhould then be rolled, that it may be ſmooth for mowing. It may be ſown at any time between April and September.

Ten pounds of burnet ſeed may do for an acre of land: but twelve, fourteen, or even ſixteen, pounds will be better; becauſe, when burnet is thin, the plants grow ſo large, that the hay made of them is coarſe. Theſe will riſe in eight or nine days after the ſowing. If great numbers of weeds come up with them, it will be leſs chargeable to let thoſe weeds grow with the burnet, till it is about five or ſix inches high, than to weed or hoe it. The whole may then be mowed, and gathered clean off; and the quick growth of the burnet afterwards will choak all other weeds. The heart of the burnet being almoſt within the ground, the ſcythe cannot hurt it.

If the burnet does not grow equally every where, ſome plants muſt be drawn where they are too thick, and planted where they are thinneſt: or the vacant ſpaces may be ſupplied from the nurſery. If the land was not got in good order to ſow the ſeeds at a proper ſeaſon, the burnet may be tranſplanted at Michaelmas from this nurſery, and ſet at nine or twelve inches diſtance every way, according to the richneſs of the ſoil.

The ſeed ſown in May may be mowed at the latter end of July. That ſown in June will yield a pretty good crop, and muſt be cut but once; and the ſame of that which is ſown in July. The plants produced by the ſeeds ſown in Auguſt ſhould be mowed, to deſtroy the weeds. Theſe mowings may either be given green to horſes, or be made into hay. The firſt ſpring cutting will purge horſes; and Mr. Rocque believes it will alſo cure the greaſe: but it is only the firſt crop that purges.

Burnet ſhould be mowed but once the firſt year, in order to leave it rank in the winter; and in this caſe it will be ready to feed in February or March, or to mow again in April.

If natural graſs grows among the burnet, it may be harrowed in the ſame manner as lucerne; for, having a tap-root, the harrow will not hurt it: but it muſt not be ploughed, leſt the roots ſhould be broken in the ground.

When the ſeeds of this plant are to be ſaved, it muſt neither be fed, nor mowed, in the ſpring. The ſeed will be ripe about the middle of June, when it muſt be reaped, like wheat, and threſhed on a cloth. It ſhould be threſhed before it is too dry, becauſe it is apt to ſhed, and it ſhould afterwards be dried perfectly.

Burnet does not loſe its leaves in drying; and though the hay made of it be ſticky, it will, after threſhing, be very agreeable to horſes, which are ſo fond of it, that they never waſte any. One acre will produce upwards of three loads of hay, and above forty buſhels of ſeeds. Horſes are fonder of this ſeed, than they are of oats: and Mr. Rocque is of opinion that it is a more proper food for thoſe that do not labour hard, becauſe it is not of ſo hot a nature. Burnet bears ſeed twice a year, and will afterwards yield a very good ſpring crop.

It is not only good for horſes, but alſo for all manner of cattle; even for ſwine: and Mr. Rocque has experienced another virtue in it, which is, that, being ſtung by a waſp, the leaves of this plant rubbed pretty hard upon the part ſo injured, immediately took off the inflammation.

Mr. Worlidge mentions as another excellent quality of this plant, that all good houſe-wives hold, as an infallible rule, that there never need be bad cheeſe or butter, but eſpecially cheeſe, where ſaxifrage grows: "from "whence," adds he, "it cometh, that the Netherlands "abound much in that commodity, and only, as is ſup"poſed, through the plenty of this herb." *Mill's Huſbandry.*

BURNING, the action of fire on ſome pabulum or fewel, whereby the minute parts of thoſe bodies are ſeparated from one another, and put into a violent motion by the action of the fire. See Fire.

Burning, or Brenning, in our ancient cuſtoms, implies an infectious diſeaſe, got in the ſtews by converſing with lewd women; and ſuppoſed to be the ſame with what is now called the venereal diſeaſe.

Burning-Glass, a convex or concave glaſs, commonly ſpherical, which being expoſed directly to the ſun, collects all the rays falling thereon into a very ſmall ſpace, called the focus, where wood, or any other combuſtible matter being put, will be ſet on fire.

Burning-glaſſes are of two kinds: the firſt, which is convex, called lentes cauſticæ, tranſmits the rays of light, and in their paſſage refract, or incline them towards the axis, having the property of lens's, and acting according to the laws of refraction. The ſecond, which are the more uſual, are concave; theſe reflect the rays of light, and in that reflection, incline them to a point in their axis, having the properties of ſpecula or mirrours, and acting according to the laws of reflection. See MIRROUR and REFLECTION.

Hiſtorians tell us, that Archimedes, by means of a concave mirrour, burnt a whole fleet: and though the effect related be very improbable, yet does it ſufficiently prove ſuch things were then known. The machines then uſed, no-body doubts, were metallic and concave, and had their focus by reflection; it being agreed that the ancients were unacquainted with the refracted foci of convex glaſſes. Yet M. de la Hire has diſcovered even theſe in the Clouds of Ariſtophanes, where Strepſiades tells Socrates of an expedient he had to pay his debts, by means of a round tranſparent ſtone, or glaſs, uſed in lighting of fires, by which he intended to melt the bond, which in thoſe days was written on wax. The glaſs here uſed to light the fire, and melt the wax, M. de la Hire obſerves, could not be concave, ſince a reflected focus, coming from below upwards, would have been very improper for that purpoſe: and the old Scholiaſt of Ariſtophanes confirms the ſentiment; and, indeed, both Pliny and Lactantius ſeem to be of this opinion, eſpecially the latter, who ſays, that a glaſs ſphere, full of water, and held in the ſun, lighted the fire even in the coldeſt weather, which inconteſtably proves the effects of convex glaſſes.

It ſeems difficult to conceive how they ſhould know ſuch glaſſes would burn, without knowing they would magnify, which it is granted they did not, till towards the cloſe of the thirteenth century, when ſpectacles were firſt thought on. For as to thoſe paſſages in Plautus, which ſeem to intimate the knowledge of ſpectacles, M. de la Hire obſerves, they do not prove any ſuch thing; and he ſolves this, by obſerving, that their burning-glaſſes being ſpheres, either ſolid or full of water, their foci would be one fourth of their diameter diſtant from them. If then their diameter were ſuppoſed half a foot, which is the moſt we can allow, an object muſt be at an inch and a half diſtance to perceive it magnified; thoſe at greater diſtances do not appear greater, but only more confuſed through the glaſs than out of it. It is no wonder, therefore, the magnifying property of convex glaſſes was unknown, and the burning one known. It is more wonderful there ſhould be three hundred years between the invention of ſpectacles and teleſcopes.

Among the ancients, the burning mirrours of Archimedes and Proclus are famous; by one of theſe the Roman ſhips beſieging Syracuſe, under the command of Marcellus, according to the relations of Zonaras, Tretzes, Galen, Euſtathius, &c. and by the other, the navy of Vitalian beſieging Byzantium, according to the ſame Zonaras, were burnt to aſhes.

Among the moderns, the moſt remarkable burning mirrours are thoſe of Settala, of Villette, and Tſchirnhauſen, and that by M. Buffon. Settala, canon of Padua, made a parabolic mirrour, which, according to Schottus, burnt pieces of wood at the diſtance of fifteen or ſixteen paces.

M. Tſchirnhauſen's mirrour at leaſt equals the former, both in bigneſs and effect. The following things are noted of it in the *Acta Eruditorum*. 1. Green wood takes fire inſtantaneouſly, ſo as a ſtrong wind cannot extinguiſh it. 2. Water boils immediately; and eggs in it are preſently edible. 3. A mixture of tin and lead, three inches thick, drops preſently; and iron and ſteel-plate becomes red-hot preſently, and a little after burns into holes. 4. Things not capable of melting, as ſtones, bricks, &c. become ſoon red-hot, like iron. 5. Slate becomes firſt white, then a black glaſs. 6. Tiles are converted into a yellow glaſs, and ſhells into a blackiſh yellow one. 7. A pumice ſtone, emitted from a volcano, melts in white glaſs: and 8. A piece of crucible alſo vitrifies in eight minutes. 9. Bones are ſoon turned into an opake glaſs, and earth into a black one. The breadth of this mirrour is near three Leipſic ells, its focus two ells from it; it is made of copper, and its ſubſtance is not above double the thickneſs of the back of a knife.

Villette, a French artiſt of Lyons, made a large mirrour, which was bought by Tavernier, and preſented to the king of Perſia; a ſecond, bought by the king of Denmark; a third preſented by the French king to the Royal Academy; a fourth has been in England, where it was publicly expoſed. The effect hereof, as found by Dr. Harris and Dr. Deſaguliers, are, that a ſilver ſixpence is melted in 7″ and $\frac{1}{2}$, a king George's halfpenny in 16″, and runs with a hole in 34. Tin melts in 3″, caſt-iron in 16″, ſlate in 3″; a foſſile ſhell calcines in 7″, a piece of Pompey's pillar at Alexandria, vitrifies in the black part in 50″, in the white in 54″; copper ore in 8″; bone calcines in 4″, vitrifies in 33. An emerald melts into a ſubſtance like a turquois ſtone, a diamond weighing four grains, loſes $\frac{7}{8}$ of its weight: the aſbeſtos vitrifies; as all other bodies will do, if kept long enough in the focus; but when once vitrified, the mirrour can go no farther with them. This mirrour is forty-ſeven inches wide, and is ground to a ſphere of ſeventy-ſix inches radius; ſo that its focus is about thirty-eight inches from the vertex. Its ſubſtance is a compoſition of tin, copper and tin-glaſs.

Every lens, whether convex, plano-convex, or convexo-convex, collects the ſun's rays, diſperſed over its convexity, into a point by refraction; and is therefore a burning-glaſs. The moſt conſiderable of this kind is that made by M. de Tſchirnhauſen: the diameters of his lens's are three and four feet, the focus at the diſtance of twelve feet, and its diameter an inch and half. To make the focus the more vivid, it is collected a ſecond time by a ſecond lens parallel to the firſt, and placed in that point where the diameter of the cone of rays formed by the firſt lens, is equal to the diameter of the ſecond; ſo that it receives them all; and the focus from an inch and a half, is contracted into the ſpace of eight lines, and its force increaſed proportionably.

This glaſs vitrifies tiles, ſlates, pumice-ſtones, &c. in a moment. It melts ſulphur, pitch, and all roſins, under water; the aſhes of vegetables, woods, and other matters, are tranſmuted into glaſs; and every thing applied to its focus, is either melted, turned into a calx, or into ſmoke. Tſchirnhauſen obſerves, that it ſucceeds beſt when the matter applied is laid on a hard charcoal well burnt.

Sir Iſaac Newton preſented a burning glaſs to the Royal Society, conſiſting of ſeven concave glaſſes, ſo placed, as that all their foci join in one phyſical point. Each glaſs is about eleven inches and a half in diameter: ſix of them are placed round the ſeventh, to which they are all contiguous; and they form a kind of ſegment of a ſphere, whoſe ſubtenſe is about thirty-four inches and a half, and the central glaſs lies about an inch farther in than the reſt. The common focus is about twenty-two inches and a half diſtant, and about half an inch in diameter. This glaſs vitrifies brick or tile in 1″, and melts gold in 30″.

In order to account for the nature of burning-glaſſes, whether mirrours or lens's, we are to conſider, that when the rays of the ſun are ſufficiently condenſed by either of theſe, they become ardent, and burn with an intenſity proportional to the denſity of the rays in the focus, or burning point of the glaſs: this denſity of rays in the focus is always as the area of the burning-glaſs directly, and the ſquare of the focal diſtance inverſely; for it is manifeſt that the denſity is as the product of the number of ſolar rays incident, upon the glaſs, by the area of the ſmall ſpace into which the reflected or refracted rays are concentered at the focus. But the number of incident rays is as the area of the mirrour or lens; and the area of the ſmall ſpace into which the rays after reflexion or refraction are concentered in the focus, being inverſely as the ſquare of the focal diſtance, it follows, that the denſity of the rays, or power of burning, will be as the area of the glaſs directly, and the ſquare of the focal diſtance inverſely; and conſequently if A and *a* denote the areas of two propoſed burning-glaſſes, whoſe focal diſtances are F and *f* reſpectively, then will P, the power of burning in the greater, be to *p*, the power of burning in the leſs, as Af^2 to aF^2; hence we have $P\times a\times F^2=p\times A\times f^2$; from this equation, the ratio of A to *a*, or that of F to *f*, may alſo be determined.

The diameter of the ſun is ſeen from the earth, under an angle of 32′ of a degree; therefore the diameter of the ſolar ſpot in the focus of Villette's mirrour will be 0.358 of an inch; for in the iſoſceles triangle ABC (pl. XXXII. *fig.* 1.) we have given the angle $ABC=32'$, and the perpendicular BD (the focal diſtance) = 38 inches, to find AC, the diameter of the ſolar focus.

As radius is to the tangent of the angle ABD, ſo is the focal diſtance BD, to the ſemi-diameter AD of the ſolar ſpot = 0.1733; whence AC = 0.3466; but the diameter of the mirrour was 47 inches: now $47\times47=2209$, and $0.3466\times0.3466=0.12013156$; wherefore the denſity of the rays in the focus will be to their common denſity as 2209 to 0.128164, which ſhews that the mirrour condenſed the ſolar rays eighteen thouſand three hundred and eighty-eight times.

Since rays but 35 times denſer than in their natural ſtate with us, have a power of burning equal to wood-fire, if we divide 18385 by 35, the quotient will be 526; therefore ſuch a mirrour will burn with an intenſity of heat 525 times greater than common fire. No wonder, then, that bodies which remain unaltered by the force of our greateſt common fires, (as that of a glaſs-houſe, where gold has been found to lie ſeveral days in fuſion, without any ſenſible loſs of weight) ſhould immediately become fuſed, fume away in part, part be diſſipated and driven away in large particles, and remain in the form of a caput mortuum, all which phænomena have been obſerved of gold, in the focus of a large burning-glaſs: and how rudely ſuch a glaſs would treat the principles of the chemiſts, and what confuſion it would induce in their arithmetic of elements, they will be better certified of, when they ſhall attempt to analyſe nature, and reduce ſubſtances to their original principles, by more active and effectual means than laboratories at preſent afford.

Notwithſtanding the prodigious denſity of the rays of the focus of theſe large burning-glaſſes, yet it has been always obſerved, that the rays reflected to us by the moon, when at full, and concentered in the focus of thoſe glaſſes, produce no heat that is ſenſible in the leaſt degree, as is demonſtrated by holding a thermometer in the focus of lunar rays, which always remains without the leaſt appearance of motion. The reaſon of this will appear by the following calculation.

Let ABD (pl. XXXII. *fig.* 2.) be the earth, C its center, MO the moon, N the center, N*e* the ſemi-diameter of the moon, which is equal to 10875 Engliſh miles, the ſemi-diameter of the earth DC = 4000 miles; the diſtances of the centers of the earth and moon NC = 240000 miles: then ſince the rays of the ſun's light at the moon are of the ſame denſity as with us (as being parallel); and ſince the lunar rays are only the ſolar rays reflected to us by the convex ſurface of the moon; and laſtly, ſince parallel rays are reflected by a ſpherical convex ſurface in ſuch a manner as to go after reflection diverging from a point, which is ½ the radius of the ſphere diſtant from the vertex (as will be ſhewn under Focus); therefore, ſuppoſing the ſurface of the moon to be perfectly ſpherical and ſmooth, we compute the denſity of the ſolar rays reflected from the moon to the earth, as follows.

Let *ab*, *cd*, be two parallel ſolar rays falling on the ſurface of the full moon, theſe rays will be reflected to the earth in the directions *bg* and *dh* diverging from a point *f* in the radius N*e*, half way between N and *e*. Now the denſity of the rays falling on the moon will be to thoſe reflected at the earth's ſurface, as the ſquare of *gh* to the ſquare of *bd*, or as the ſquare of *f*D to the ſquare of *fe*; but $fe=544$ miles, and $fD\ (=NC-CD-Nf=240000-4544)=235456$; and the ſquare of 235456 is to the ſquare of 544, as 187400 to 1 nearly; conſequently the denſity of the lunar rays is to that of the ſolar rays at the earth's ſurface, as 1 to 187400 nearly; therefore a burning-glaſs muſt condenſe the lunar rays 187400 times, to make them have the head of common ſun-beams. But this is 10 times more than Villette's mirrour can effect.

Now all this is upon ſuppoſition that the moon is a ſphere, and its ſurface perfectly ſmooth, whereas neither of theſe things have place in nature; for the moon is not a ſphere but a ſpheriod, and her ſurface very uneven; on both theſe accounts, the reflection of light muſt be many times weaker than we have ſuppoſed it; and accordingly M. Bouguer, by experiments, has found that it is about 17 times leſs, or that the denſity of the lunar rays is to that of the ſolar, as 3000000 to 1; wherefore, a burning-glaſs muſt condenſe the rays from the moon near 3000000, i. e. three millions of times, to make them of ſufficient warmth to raiſe the liquor of the common thermometer; which is an effect almoſt 200 times greater than Villette's mirrour can produce.

Burning *of Land*, a very great improvement in huſbandry, and is not only at this time uſed in many parts of this and other kingdoms, but it has been practiſed from the earlieſt times. Virgil very expreſsly mentions, and greatly recommends it; and all the old writers of huſbandry ſay much in its praiſe.

It does not take effect, however, in all ſorts of ground. It is not proper for rich ſoils, nor for ſtony or chalky ones; nor is it a practice often to be repeated on any land, eſpecially where the ſurface is very ſhallow; nor muſt corn be ſown too long upon the land afterwards; for burning exhauſts the good juices of the land, in ſome degree, as well as the bad ones. It is moſt profitably uſed to ſuch lands as have laid a long time uncultivated, and over-run with rank weeds, ſuch as ſoure graſs, fern, heath, furze, and the like. Some lands, when corn is ſown upon them, run it up into ſtraw, and make the ears but poor and light; theſe are, beyond all others, improved by burning. The uſual methods of ploughing up for this is with a breaſt-plough, which a man puſhes before him, and cuts the turf off the ſurface, turning it over when he has cut it to about eighteen or twenty inches long. The common way is only to pare it about half an inch thick; but if it be very full of weeds, with ſtubborn roots, it is better to go deeper.

If the ſeaſon proves dry, the turf needs no more turning, but dries as it lies. If it be wet, it is neceſſary to ſet it on edge, and keep it hollow till ſuch time as the wind and air have ſufficiently dried it. It is then to be piled up in little heaps, about the quantity of two wheel-barrows full in each heap; and if there be much roots and a good head upon it, there needs no farther care but ſetting it on fire, and the whole heap will be reduced to aſhes; but if it be earthy and too dead to burn out by itſelf, there muſt be a heap of furze or heath laid under every parcel.

When the heaps are reduced to aſhes, they are left upon the place till ſome rain comes to wet them; otherwiſe, in the ſpreading, they would all blow away. When they are wetted, the farmer takes the opportunity of a calm day, and ſpreads them as equally as poſſible over the whole land, cutting away the earth a little under the heaps, to abate its over-great fertility there. After this, the land is to be ploughed but very ſhallow, and the corn is to be ſown upon it only in half the quantity that it is upon other land; and the later this is ſown the better. If it be wheat, the beſt time is the latter end of October; for if ſown ſooner, it is apt to grow too rank. The beginning of May is the proper time for cutting the turf off from theſe lands, becauſe there is then time ſufficient to get the land in order for ſowing at the proper ſeaſon. The whole charge of cutting, carrying, and burning the turf, is generally about twenty-four ſhillings an acre.

The turf is not to be burnt to white aſhes; for this waſtes a great part of its ſalt; it is only to be burnt ſo as to crumble all to pieces, and be in a condition to ſpread well upon the land; and it is better that the heaps of it ſhould burn ſlowly and gradually than furiouſly.

Some farmers ſtub up furze, heath, and the like, and, covering heaps of them with the parings of the earth, ſet fire to them; others burn the ſtubble of the corn-fields; and others the ſtalks of all ſorts of weeds, and add half a peck of unſlaked lime to every buſhel of aſhes. They cover the lime with the aſhes, and leave heaps in this manner till there comes ſome rain to ſlake the lime; and after

Facing **Burroughs's** *Machine* .

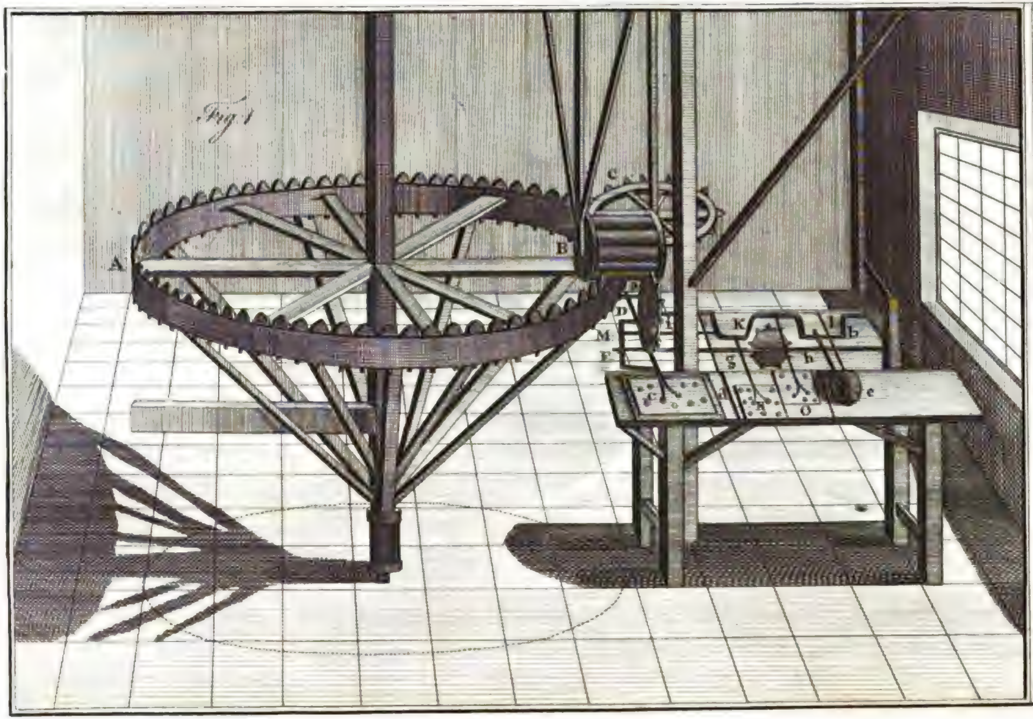


Fig. 1

A
B
C
E
D
I
M
F
K
l
b
g
h
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d
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O
e

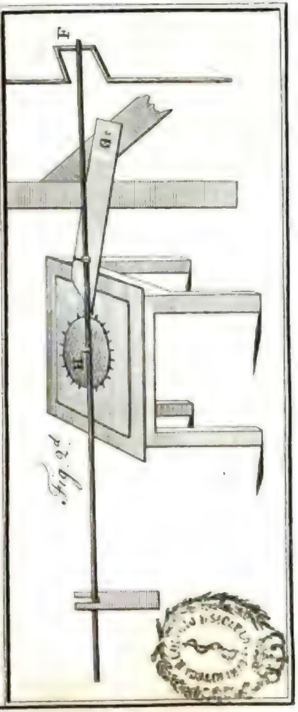

Fig. 2d

after this, they ſpread the mixture carefully over the field. There is one great advantage attending this ſort of manure, which is, that it does not breed weeds like the common way with dung, but only fill the ears of the corn, not running them up into ſtalk; but it is proper to add ſome dung to theſe lands at the time of ploughing them up for a ſecond or third crop of corn. *Mortimer's Huſbandry*.

BURNING, in enamel painting. See ENAMEL *Painting*.

BURNISHER, a round poliſhed piece of ſteel, ſerving to ſmooth and give a luſtre to metals.

Of theſe there are different figures, ſtraight, crooked, &c. Half burniſhers are uſed to ſolder ſilver, as well as to give a luſtre. See the article SOLDERING.

BURNISHING, the art of ſmoothing or poliſhing a metalline body, by a briſk rubbing of it with a burniſher.

BURR, the round knob of a horn next a deer's head.

BURROUGHS's *Machine*, a mill or machine for grinding and poliſhing glaſs plates, invented by Mr. Burroughs of Southwark; and for which the Society for the Encouragement of Arts, gave him a premium of ſeventy pounds.

Explanation of plate XXVII. repreſenting Mr. Burroughs's machine.

This machine conſiſts of a cog-wheel A, (*fig.* 1.) twelve feet in diameter, carrying ſeventy-two cogs; which turn a trundle-head B, one foot four inches in diameter, and furniſhed with eight rounds; and alſo an horizontal ſpur-wheel C, of twelve cogs, and one foot eight inches in diameter. The trundle-head B turns a ſpur-wheel D of ten cogs, and two feet eight inches in diameter. This ſpur-wheel has two cranks, *a*, *b*, in its ſhaft; one of which *a*, gives motion to a wooden frame *c*, about thirty-four inches long, and nineteen broad. On the under ſide of this frame are faſtened by ſcrews, twelve pieces of poliſhed metal, each five inches and a half long, and three broad, covered with leather; and underneath theſe poliſhers, a glaſs plate, cemented in another frame, is placed on the bench *d*, and poliſhed with tripoli by the motion given to the upper frame, by the crank *a*. The nuts of the ſcrews, which faſten the poliſhers to the upper frame, are not ſcrewed cloſe to the wood, in order to give the frame room to play; by which contrivance the perpendicular riſe of the crank is avoided, and the motion of the poliſhers always parallel and equal. The under frame may be moved by the hand in any direction without ſtopping the machine, by which means the plate, when larger than the poliſhing frame can cover in its motion, will be equally poliſhed in every part.

The other crank *b* gives motion to two other poliſhers marked *n*, *o*, which have an alternate motion by the bending of the crank; they move upon the ſame plate, and have an equal number of poliſhers, as that already deſcribed.

The ſame crank alſo gives motion to a contrivance repreſented at *e*, for poliſhing ſpectacle-glaſſes. It conſiſts of two ſegments of the ſame ſphere, one concave and the other convex. On the latter, the glaſſes are cemented and poliſhed by the former, which is moved by the crank *b*. The convex ſegment may be moved round by the hand, without ſtopping the machine, ſo that all the glaſſes on its ſuperficies will be equally poliſhed.

The other ſpur-wheel C, by means of a crank in its ſhaft, gives motion to another frame *g*, employed in grinding the glaſs plates. The rod *h* extended from the crank *f*, to the frame *g*, is faſtened to the latter by means of a pivot, in order to admit of a rotary motion, as well as that given it by the crank in a longitudinal direction. This rotary motion is effected by means of a rod of iron *i*, called a trigger, ſharp at the extremity next the frame, where it touches the teeth of an horizontal ſpur-wheel, or circular piece of wood *k*, fixed on the grinding-plate, while the other end is extended three feet two inches to the center of motion.

But this contrivance, in which the merit of the machine principally conſiſts, will be much better conceived from a ſmall delineation of it by itſelf, (*fig.* 2.) where F is the crank marked *f*, in *fig.* 1. and turned by the ſpur-wheel C, in the ſame figure. G is the trigger, three feet two inches long. I, a roll fixed on the trigger for the rod to ſlide on. H the horizontal ſpur-wheel eleven inches in diameter, fixed on the grinding-plate, the teeth of which is touched by the trigger, but with a very unequal force, as it will wholly depend upon the grinding plate's being farther from, or nearer to, the center of motion of the trigger. By this ſimple contrivance the grinding-plate has a very compound motion, never moving exactly in the ſame tract, and therefore muſt grind the plates equally in every part. Several attempts have been made by others for producing the ſame effect, but without ſucceſs; the grinding-plate always following the ſame tract, and conſequently the plates were ground unequally. See the articles GRINDING and POLISHING *Glaſs*.

BURSA-PASTORIS, ſhepherd's purſe, in botany, a diſtinct genus of plants, with ſmall tetrapetalous whitiſh flowers along the upper part of the branches, followed each by a triangular ſeed veſſel, reſembling a purſe, whence its name. The lower leaves are for the moſt part deeply jagged, like thoſe of dandelion, and widen from the bottom forwards; thoſe on the ſtalks are entire, and moſt of them broadeſt at the bottom, with a little ear on each ſide at the juncture with the ſtalk. It is annual, common in waſte grounds, and found in flower from April to the end of ſummer.

This herb has, when freſh, an unpleaſant ſmell, which in drying is diſſipated. Its taſte is almoſt merely herbaceous. An extract made from the dry leaves by water is ſomewhat ungratefully mucilaginous and ſubſaline: an extract made by rectified ſpirit has ſomewhat more of an unpleaſant, though weak, taſte; no pungency or aſtringency could be perceived, either in the leaves themſelves or in the extracts; nor did a decoction of them ſtrike any degree of blackneſs with ſolution of chalybeate vitriol. There does not appear, therefore, to be much foundation for the ſtrong ſtyptic virtues, for which this herb has been generally recommended by writers on the materia medica; or for the acrid inflammatory power which Boerhaave (miſled probably by its botanic affinity with muſtard and ſome other acrid vegetables) has aſcribed to it. *Lewis's Hiſtory of the Materia Medica*.

BURTHEN, in naval affairs, the weight or meaſure of any ſpecies of goods, &c. that a ſhip will carry.

BURTON, among ſeamen, a ſmall tackle to be moved any where, to hoiſt up or draw along bodies of little weight; alſo to draw tight the ſmaller ſhrouds and ſtays.

BUSHEL, a meaſure of capacity for dry things, as grain, fruits, dry pulſe, &c. containing four pecks, or eight gallons, or one-eighth of a quarter.

A buſhel, by 12 Henry VII. c. 5. is to contain eight gallons of wheat; the gallon eight pounds of troy-weight; the ounce twenty ſterlings, and the ſterling thirty-two grains, or corns of wheat growing in the midſt of the ear. See the articles MEASURE and WEIGHT.

At Paris, the buſhel is divided into two half buſhels; the half buſhel into two quarts; the quart into two half quarts; the half quart into two litrons; and the litron into two half litrons.

BUSKIN, a kind of ſhoe, ſomewhat in manner of a boot, and adapted to either foot, and worn by either ſex.

This part of dreſs, covering both the foot and mid-leg, was tied underneath the knee; it was very rich and fine, and principally uſed on the ſtage by actors in tragedy. It was of a quadrangular form, and the ſole was ſo thick, as that by means thereof, men of the ordinary ſtature might be raiſed to the pitch and elevation of the heroes they perſonated. The colour was generally purple on the ſtage: and was diſtinguiſhed from the ſock, worn in comedy, that being only a low common ſhoe. The buſkin ſeems to have been worn, not only by actors, but by girls, to raiſe their height; travellers and hunters alſo made uſe of it, to defend themſelves from the mire.

In claſſic authors, we frequently find the buſkin uſed to ſignify tragedy itſelf, in regard it was a mark of tragedy on the ſtage.

It is alſo uſed to imply a lofty ſtrain, or high ſtyle.

BUSS, in maritime affairs, a ſmall ſea veſſel, uſed by us and the Dutch in the herring fiſhery, commonly from forty-eight to ſixty tons burden, and ſometimes more: a buſs has two ſmall ſheds or cabbins, one at the prow, and the other at the ſtern; that at the prow ſerves for a kitchen.

BUST, or **Busto**, in ſculpture, &c. a term uſed for the figure or portrait of a perſon in relievo, ſhewing only the head, ſhoulders and ſtomach, the arms being lopped off: it is uſually placed on a pedeſtal or conſole.

BUSTARD, in ornithology, the Engliſh name of a genus of birds, called by authors otis. See Otis.

BUSTUARII, in Roman antiquity, gladiators who fought about the buſtum, or funeral pile of a deceaſed perſon of diſtinction, in the ceremony of his obſequies.

BUTCHER-BIRD, in ornithology, the Engliſh name of the lanius. See Lanius.

Butcher's-Broom, *Ruſcus*, in botany. See the article Ruscus.

BUTLER, *Buticularius*, the name anciently given to an officer in the court of France, being the ſame as the grand echanſon, or great cup-bearer of the preſent times.

Butler, in the common acceptation of the word, is an officer in the houſes of princes and great men, whoſe principal buſineſs is to look after the wine, plate, &c.

BUTMENTS, in architecture, thoſe ſupporters or props on or againſt which the feet of arches reſt. See Bridge.

Butment is alſo the term given to little places taken out of the yard or ground-plot of a houſe, for a buttery, ſcullery, &c.

BUTOMUS, the flouring-buſh, in botany, a genus of plants, the flower of which conſiſts of ſix roundiſh, concave, fading petals, alternately exterior, ſmaller, and more acute. The fruit conſiſts of ſix oblong, gradually attenuated capſules, erect, of one valve, opening inwards, and containing ſeveral oblong cylindric ſeeds, obtuſe at both ends. The herb is ſaid to be of an aperient and deobſtruent quality.

BUTT, in naval affairs, the end of any plank in a ſhip's ſide, which cloſes with another: when a plank is looſened at one end by the labouring of the ſhip, or other accident, it is ſaid to be ſtarted.

BUTTER, a fat unctuous ſubſtance, prepared or ſeparated from milk by churning it. For the manner of making butter, ſee the article Dairy.

The word is formed from the Greek, βουτυρον, which is compounded of βους, a cow, and τυρος, cheeſe.

Butter, among chemiſts, a name given to ſeveral preparations, on account of their conſiſtence reſembling that of butter; as butter of antimony, of arſenic, of wax, of lead, of tin, &c.

Butter-Bump, in zoology, a bird of the heron kind, more uſually called bittern. See the article Bittern.

Butter-Bur, in botany, the Engliſh name of a genus of plants, called by authors petaſites. See the article Petasites.

Butter-Fish, a name given to the gunnellus of authors. See Gunnellus.

BUTTERFLY, the Engliſh name of a numerous genus of inſects, called by zoologiſts papilio. See Papilio.

Butterfly-Fish, a ſpecies of the blennius of ichthyologiſts, with a furrow between the eyes. It is common in the American ſeas.

Butterfly-Flower, a name given by ſome to the orchis of botaniſts.

Butterfly-Shell, in natural hiſtory, the Engliſh name of a ſpecies of voluta.

BUTTERIS, in the menage, an inſtrument of ſteel, fitted to a wooden handle, wherewith they pare the foot, or cut the hoof of a horſe.

BUTTER-MILK, a kind of ſerum that remains behind, after the butter is made. Of this curds may be made, which are good when eat either with cream, wine, ale or beer. And the whey kept in a clean ſtrong veſſel, is an excellent cooling, wholeſome drink, to be uſed in the ſummer inſtead of other drink, and will quench the thirſt better than beer.

Butter-milk is eſteemed an excellent food, in the ſpring eſpecially, and is particularly recommended in hectic fevers.

Butter-Wort, in botany, the Engliſh name of a diſtinct genus of plants, called by botaniſts pinguicula. See the article Pinguicula.

BUTTERY, a room in the houſes of noblemen and gentlemen, belonging to the butler, where he depoſites the utenſils belonging to his office, as table linen, napkins, pots, tankards, glaſſes, cruets, ſalvers, ſpoons, knives, forks, pepper, muſtard, &c.

BUTTOCK, in naval architecture, the round parts of a ſhip behind, under the ſtern, terminated by the counter above, and the after-part of the bilge below.

BUTTON, an article in dreſs, whoſe form and uſe are too well known to need deſcription.

Buttons are made of various materials, as mohair, ſilk, horſe-hair, metal, &c.

Method of making common Buttons.—Common buttons are generally made of mohair; ſome indeed are made of ſilk, and others of thread; but the latter are a very inferior ſort. In order to make a button, the mohair muſt be previouſly wound on a bobbin; and the mould fixed to a board by means of a bodkin thruſt thro' the hole in the middle of it. This being done, the workman wraps the mohair round the mould in three, four, or ſix columns, according to the button.

Horſe-Hair Buttons. The moulds of theſe buttons are covered with a kind of ſtuff compoſed of ſilk and hair; the warp being belladine ſilk, and the ſhoot horſe-hair. This ſtuff is wove with two ſelvedges in the ſame manner, and in the ſame loom as ribbands. This ſtuff is cut into ſquare pieces proportional to the ſize of the button, wrapped round the moulds, and their ſelvedges ſtitched together, which form the under part of the button.

Cleanſing of Buttons. A button is not finiſhed when it comes from the maker's hands; the ſuperfluous hairs and hubs of ſilk muſt be taken off, and the button rendered gloſſy and beautiful, before it can be ſold. This operation is performed in the following manner:

A quantity of buttons are put into a kind of iron ſieve, called by workmen a ſinging-box. Then a little ſpirit of wine being poured into a ſhallow iron diſh, and ſet on fire, the workman moves and ſhakes the ſinging-box, containing the buttons, briſkly over the flame of the ſpirit, by which means the ſuperfluous hairs, hubs of ſilk, &c. are burnt off, without damaging the buttons. Great care however muſt be taken that the buttons in the ſinging-box be kept continually in motion; for if they are ſuffered to reſt over the flame, they will immediately burn.

When all the looſe hairs, &c. are burnt off by the flame of the ſpirit, the buttons are taken out of the ſinging-box, and put, with a proper quantity of the crumbs of bread, into a leather bag, about three feet long, and of a conical ſhape; the mouth or ſmaller end of which being tied up, the workman takes one of the ends in one hand, and the other in the other, and ſhakes the bag briſkly, with a particular jerk. This operation cleanſes the buttons, renders them very gloſſy, and fit for ſale.

Gold-Twiſt Buttons. The mould of theſe buttons is firſt covered with ſilk in the ſame manner as that of common buttons. This being done, the whole is covered with a thin plate of gold or ſilver, and then wrought over in different forms with purle and gimp. The former is a kind of thread compoſed of ſilk and gold-wire twiſted together; and the latter, capillary tubes of gold or ſilver, about the tenth of an inch in length. Theſe are joined together by means of a fine needle filled with ſilk, thruſt through their apertures, in the ſame manner as beads or bugles.

Explanation of Plate XXVIII.

The upper compartment of the plate repreſents a ſection of a mohair-button maker's ſhop, with perſons at work.

Fig. 1. A workman looking at the face of a button which he has juſt covered with mohair, ſilk, &c. from the reel which is placed before him by means of an iron bodkin, Facing Button.

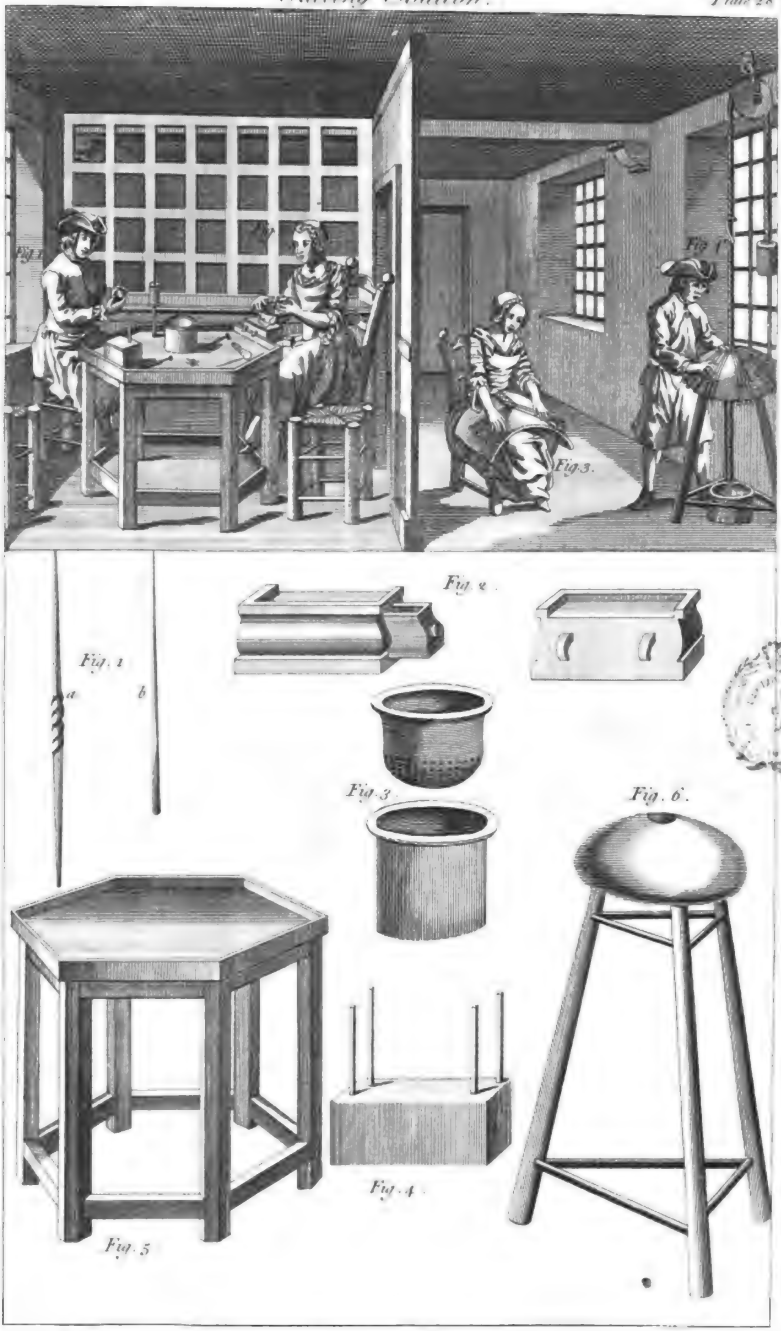
Fig. 1
Fig. 3.
Fig. 1
Fig. 2.
Fig. 1
a
b
Fig. 3.
Fig. 6.
Fig. 4.
Fig. 5

PLATE XXIX

Facing Metal Buttons

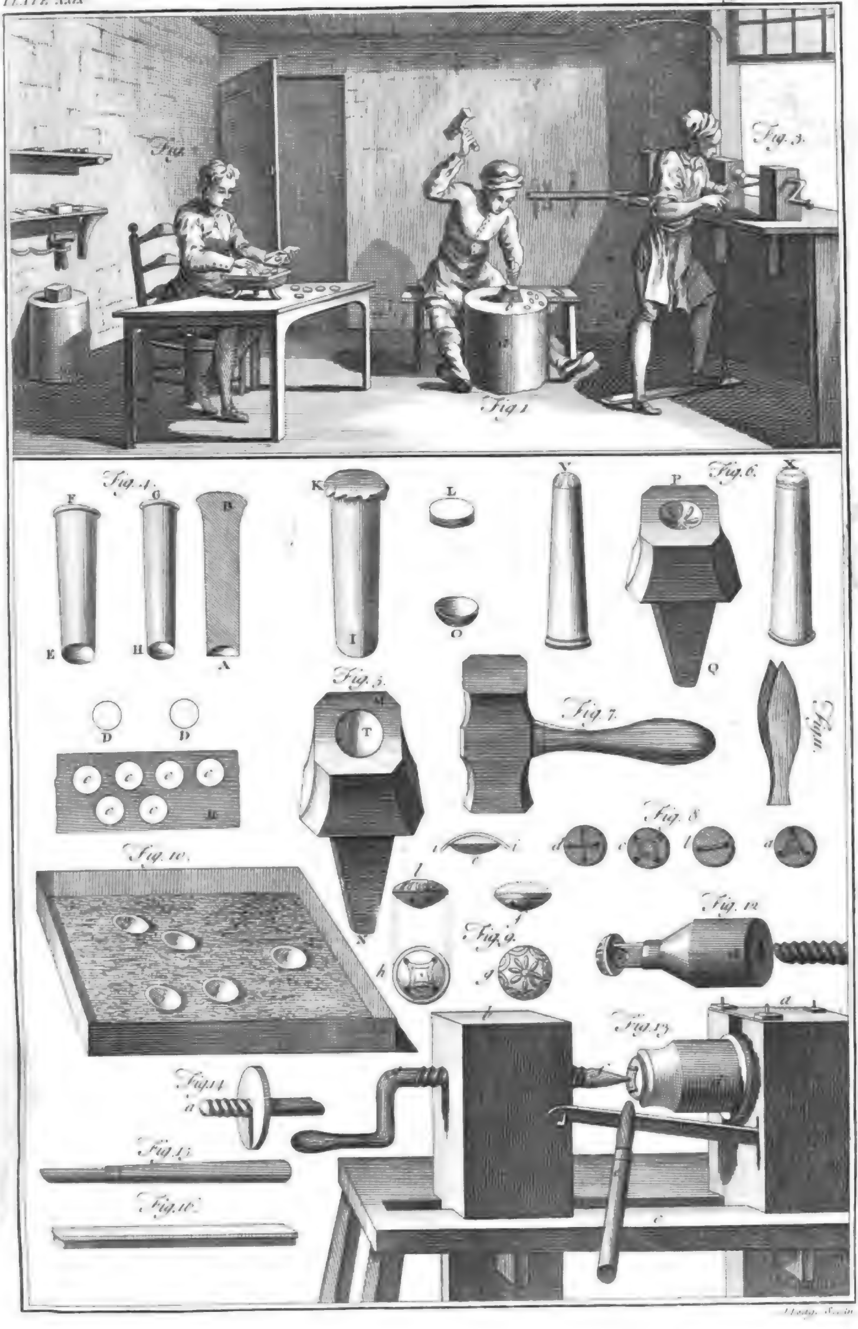
Fig.
Fig. 3.
Fig. 1
Fig. 4.
F
G
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Fig. 6.
X
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Fig. 5.
M
T
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D
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c
c
c
E
Fig. 7.
Fig. 11.
Fig. 8
d
c
b
a
Fig. 10.
i
e
i
N
l
f
Fig. 9.
h
g
Fig. 12
Fig. 13
a
b
c
Fig. 14
a
Fig. 15.
Fig. 16.

bodkin, fixed vertically in a hole of the table. The table is generally of a hexagonal form, that ſix perſons may work at it at the ſame time; but to avoid confuſion, two only are repreſented in the figure.

Fig. 2. A woman ſewing the purle and other ornaments upon the button. She has before her a ſmall box, with a drawer in it, hung to the border of the table. In the middle of the table is a box for holding the purles, gimps, &c. for ornamenting the buttons.

Fig. 3. A woman making what are generally call'd Brandenburgs. The work has a great affinity with lace making. It is made upon a broad and thin piece of wood, bent into a circular form, in order to embrace the knees of the perſon who performs the work. The bobbins paſs from one ſide to the other, in the ſame manner as thoſe in making lace do upon the cuſhion.

Fig. 4. A workman making the round twiſts with which the middle parts of the Brandenburgs are decorated.

Lower Compartment of the Plate.

Fig. 1. *a*, a double broach or bodkin. *b*, a ſingle broach.

Fig. 2. Two views of the little box hanging before the perſon, *fig.* 2, in the upper compartment: the one a view of the fore-part, with the drawer partly out; and the other of the back part.

Fig. 3. The ſinging-box, and the place for holding the ſpirit ſeparated.

Fig. 4. A block in which four broches which receive a certain number of reels filled with ſilk, mohair, &c.

Fig. 5. The table in perſpective.

Fig. 6. The ſtool uſed by the perſon, *fig.* 4, in the upper compartment.

The manner of making Metal BUTTONS. The metal with which the moulds are intended to be covered is firſt caſt into ſmall ingots, and then flatted into thin plates or leaves, of the thickneſs intended, at the flatting mills; after which it is cut into ſmall round pieces proportionable to the ſize of the mould they are intended to cover, by means of proper punches on a block of wood covered with a thick plate of lead. Each piece of metal thus cut out of the plate is reduced into the form of a button, by beating it ſucceſſively in ſeveral cavities, or concave moulds, of a ſpherical form, with a convex puncheon of iron, always beginning with the ſhalloweſt cavity or mould, and proceeding to the deeper, till the plate has acquired the intended form: and the better to manage ſo thin a plate, they form ten, twelve, and ſometimes even twenty-four to the cavities, or concave moulds, at once, often nealing the metal during the operation, to make it more ductile. This plate is generally called by workmen, the cap of the button.

The form being thus given to the plates, or caps, they ſtrike the intended impreſſion on the convex ſide by means of a ſimilar iron puncheon in a kind of mould engraven en creux, either by the hammer, or the preſs uſed in coining. The cavity of mould, wherein the impreſſion is to be made, is of a diameter and depth ſuitable to the ſort of button intended to be ſtruck in it; each kind requiring a particular mould. Between the puncheon and the plate is placed a thin piece of lead, called by workmen a hob, which greatly contributes to the taking off all the ſtrokes of the engraving; the lead by reaſon of its ſoftneſs, eaſily giving way to the parts that have relievo; and as eaſily inſinuating itſelf into the traces or indentures.

The plate thus prepared makes the cap or ſhell of the button. The lower part is formed of another plate, in the ſame manner, but much flatter, and without any impreſſion. To the laſt or under plate is ſoldered, a ſmall eye made of wire, by which the button is to be faſtened.

The two plates being thus finiſhed, they are ſoldered together with ſoft ſolder, and then turned in a lathe. Generally indeed they uſe a wooden mould, inſtead of the under plate; and in order to faſten it, they paſs a thread or gut a-croſs, through the middle of the mould, and fill the cavity between the mould and the cap, with cement, in order to render the button firm and ſolid; for the cement entering all the cavities formed by the relievo of the other ſide ſuſtains it, prevents its flattening, and preſerves its boſſe or deſign.

Explanation of Plate XXIX.

The upper compartment of the plate repreſents the ſhop of a metal-button maker.

Fig. 1. is a workman forming the pieces of metal, after they are cut out of the plate, in the mould: *a*, the block: *b*, the mould.

Fig. 2. A workman employed in filling the caps of the buttons formed by the workman, *fig.* 1. Theſe caps are placed with their concave ſide upwards, in a ſhallow veſſel filled with ſand, over a chaffin-diſh of coals. When the cement is melted in the cap, he applies the mould to the cap, while the cement is hot, and having fixed the mould in its proper place, takes the button out of the ſand with a pair of nippers, and places it on the table, where it lies till cold.

Fig. 3. A workman turning the buttons in a lathe, after they have undergone the operation of the workman, *fig.* 2.

Lower Compartment of the Plate.

Fig. 4. E F, G H, are punches of different ſizes for cutting the ſmall pieces of metal from the plates.

A B, a ſection of one of thoſe punches.

D, D, ſmall pieces of metal cut out of the plate by the above punches.

R, a piece of one of the plates formed at the flatting-mills. *c*, *c*, *c*, *c*, *c*, *c*, holes whence the pieces D, D, were taken.

Fig. 5. A plain mould. M, the face or upper part of the mould. N, the tail, or that part which goes into block. T, the cavity, or hollow part of the mould. I K, a puncheon fitted to the above mould. Several of the ſmall pieces (as D, D, *fig.* 4. cut from the plate R) are placed on one another, as at L, and put into the hollow part of the mould T, and forced in by the puncheon I K, driven by the hammer repreſented *fig.* 7. by which means the caps become convex on one ſide, and concave on the other, as repreſented at O. After this they are placed in the mould, *fig.* 6. engraven en creux, and driven by a puncheon fitted to it, where they acquire the intended relievo.

Fig. 6. P Q, a mould engraven en creux.

V, X, puncheons engraven in relievo.

Fig. 7. The hammer uſed in making the caps, &c. of the buttons.

Fig. 8. *a*, *b*, *c*, *d*, four different manners of ranging the threads or guts in the moulds of buttons.

Fig. 9. *e i i*, profile of a button ready to be ſet; which conſiſts in bending the parts *i i*, of the cap, round the upper part of the mould *e*, as repreſented at *f*. The principal part of this is done in the lathe. *g*, the cap or upper part of the button. *h*, the under part of the ſame button. *l*, the ſame ſeen in profile.

Fig. 10. A ſhallow veſſel of copper. 1, 2, 3, 4, 5, caps of buttons placed on the ſand, with which the bottom of the veſſel is covered, as mentioned in the upper compartment, *fig.* 2.

Fig. 11. A pair of nippers for taking the caps of the buttons out of the ſand, when the cement is melted.

Fig. 12. A mandrel for poliſhing buttons.

Fig. 13. *a b c*, a lathe for ſetting and poliſhing buttons. *d*, the mandrel to which the under part of the button is fixed. *e*, the burniſher or tool by which the ſetting is performed. *f g*, the ſcrew of the lathe, by which the button is fixed to the mandrel *d*.

Fig. 14. The female ſcrew of the mandrel. *a*, the male ſcrew by which it is faſtened.

Fig. 15. The burniſher or tool uſed in ſetting and poliſhing the edge or rim of the button.

Fig. 16. A piece of wood, covered with buff leather, for poliſhing the caps, or upper parts of the buttons.

BUTTON-MOULD, the piece of wood, &c. covered with mohair, ſilk, metal, &c.

Manner of making BUTTON-MOULDS. The wood is firſt ſown into pieces of a proper thickneſs; and then the moulds turned out of theſe pieces by means of tools called piercers, of various forms and dimenſions, according to the nature and ſize of the moulds intended to be made. If the moulds are very ſmall, they are turned in a ſmall lathe, by means of a bow; but if large, in a lathe turned by a wheel, as one man cannot turn the lathe with his foot, and manage the block of wood at the ſame time; at leaſt not with that facility or diſpatch as in the other manner.

Explanation of Plate XXX.

The upper compartment of the plate repreſents the ſhop of a button-mould maker, with the men employed in the different parts of that trade.

Fig. 1 and 2, two men employed in ſawing the wood into pieces of a proper thickneſs for the moulds.

Fig. 3 and 4, the workman, aſſiſted by a woman, employed in making the moulds of ſmall buttons. It is done by means of a bow, which turns a piercer, in the manner of a ſmall lathe, by which means the piercer cuts the moulds out of the flat piece of wood prepared for that purpoſe.

Fig. 5, 6, and 7, workmen employed in turning or cutting out the moulds of large buttons.

Lower Compartment of the Plate.

1, 2, 3, 4, 5, 6, 7, piercers of different kinds and dimenſions; ſome are for making different holes in the mould; and others for giving it at the ſame time the concave or convex form, either on the top or bottom of the mould.

8. A hand-ſaw.
9. A pair of calibers.
10. A pair of pincers.
11. A, B, chiſſels of different forms.
12. C, D, other ſort of chiſſels.
13. E, F, ſpindles uſed in turning.
14. A block of wood.
15. A gage for cutting the pieces of wood to a proper thickneſs.
16. A hammer.
17. A cleaver.
18. A raſp.

Button, among gardeners, denotes a flower or cluſter of leaves not yet expanded.

Buttons are a kind of ova, out of which ariſe either leaves alone, or intermixed with flowers. Leaf buttons are ſmaller and more pointed than flower buttons, which are bigger and rounder. Among trees which bear kernel fruit, each button produces ſeveral flowers; and among ſtone fruit-trees, each button yields but one flower.

Button, in fencing, ſignifies the end or tip of a foil, being made roundiſh, and uſually covered with leather, to prevent making contuſions in the body.

Button, in building, denotes a ſlight faſtening for a door or window, made to turn on a tail.

Button *of the Reins of a Bridle*, is a ring of leather, with the reins put through it, running all along the length of the reins.

Button, *Antennæ*, a name given by naturaliſts to thoſe antennæ, or horns, as they are called, of butterflies, which are ſlender and terminated at the top by a ſort of button, in form of an olive, or part of one.

BUTTRESS, a kind of butment built archwiſe, or a maſs of ſtone or brick, ſerving to prop or ſupport the ſides of a building, wall, &c. on the outſide, where it is either very high, or has any conſiderable load to ſuſtain on the other ſide, as a bank of earth, &c.

Buttreſſes are uſed againſt the angles of ſteeples and other buildings of ſtone, &c. on the outſide, and along the walls of ſuch buildings as have great and heavy roofs, which would be ſubject to thruſt the walls out, unleſs very thick, if no buttreſſes were placed againſt them: they are alſo placed for a ſupport and butment againſt the feet of ſome arches that are turned acroſs great halls, in old palaces, abbeys, &c.

The theory and rules of buttreſſes are one of the deſiderata in architecture; but the ſize and weight of them ought to be in proportion to the dimenſions and form of the arch, and the weight which is ſuperincumbent on it.

As to the weight of the materials, both on the arch and in the buttreſs, it is not difficult to calculate: but it may be objected, that there may be a ſenſible difference as to the ſtrength and goodneſs of the mortar, which may, in ſome meaſure, compenſate for the weight of the buttreſs. See Bridge.

BUXTON-WELLS, a place much frequented on account of its celebrated medicinal waters; which are the hotteſt in England, next to Bath.

Theſe waters greatly promote digeſtion, unleſs they are drank too long, in which caſe they relax the ſtomach, and retard all digeſtion: they are well adapted to obſtructions of every kind, whence they produce ſurpriſing effects in gouty, rheumatic, and ſcorbutic pains; their irritation and effects are relaxation and dilution; and wherever theſe are indicated, this water will be of the greateſt ſervice: it is of great benefit to thoſe obſtructions which ariſe from a ſharpneſs, ſaltneſs, or earthineſs of the blood and lymph, or from an accidental diſpoſition to a rarefaction of the blood. As this water is warm, highly impregnated with a mineral ſteam, vapour, or ſpirit, it is ſignally beneficial in cramps, convulſions, dry aſthmas, bilious cholic, ſtiffneſs, &c.

They adviſe both drinking and bathing in the uſe of theſe waters; but the latter is of bad conſequence in the gout, inward inflammations, fevers, dyſentery, large and inward tumours, or in an outward preſſure of the body.

As to the age, ſex, and conſtitution of the patient, the particular lightneſs and purity of theſe waters recommend their uſe, as ſafe and ſucceſsful to almoſt every body in whatever circumſtances.

BUXUS, the *Box-Tree*, in botany, a genus of evergreen ſhrubs, with numerous branches, clothed with firm, ſhining, ſomewhat oval leaves: the wood is of a yellow colour, and more compact and ponderous than any of the other European woods: the flowers are imperfect; the fruit, which grows on a diſtinct part of the tree, is a green berry, divided into three cells, containing ſix ſmall ſeeds. It is found wild in ſome parts of England.

The leaves of this tree have a faint unpleaſant ſmell, which is in great part diſſipated in drying, and pretty ſtrongly impregnates water in diſtillation: their taſte is ſomewhat of the bitter kind, very ſtrong, and very nauſeous. It is ſaid that their effluvia are narcotic; and that the leaves in ſubſtance, and infuſions or decoctions of them, are aperient and purgative.

The wood gives a bright yellow tincture to ſpirituous menſtrua, and a paler yellow to water. Chewed, in ſubſtance, it ſcarcely diſcovers any taſte: an extract made from it by rectified ſpirit, which amounts to little more than one fifteenth part of the weight of the wood, is weakly bitteriſh: by water was obtained nearly one thirtieth its weight, of a ſtronger taſted, ungratefully ſaline extract. From theſe experiments, it may be preſumed, that boxwood contains little active matter; and that this matter is not of the pungent reſinous, but of the ſaline kind; and conſequently that it differs greatly from guaiacum wood, to which it is by many writers ſuppoſed to be ſimilar.

BUZZARD, *Buteo*, in ornithology, the Engliſh name of ſeveral ſpecies of the hawk-kind, diſtinguiſhed from each other by particular epithets; as, 1. The bald buzzard, with blue legs. 2. The common buzzard. 3. The honey buzzard. 4. The ſubbuteo, or the hen-harrier, and the ring-tail. 5. The moor-buzzard, &c.

BY-LAWS, or **Bye-Laws**, private and peculiar laws for the good government of a city, court, or other community, made by the general conſent of the members.

BYRLAW, or **Burlaw-Laws**, in Scotland, are made and determined by neighbours elected by common conſent in byrlaw-courts. The men, choſen as judges, are called byrlaw or burlawmen, and take cognizance of complaints between neighbour and neighbour.

BYSSUS, in botany, a genus of moſſes, conſiſting of plain, ſimple, capillary filaments.

The byſſus is the moſt imperfect of all vegetables, no part of its fructification having been hitherto diſcovered: its filaments are uniform, and often ſo fine as to be ſcarce diſcernible ſingly; though, in a cluſter, they make a kind of fine down. Botaniſts are not agreed whether the byſſus be properly a moſs or fungus. Linnæus is of the latter opinion, and the generality of botaniſts of the former. Dillenius thinks it is of a middle nature, between both.

PLATE XXI.

Facing Button Mould

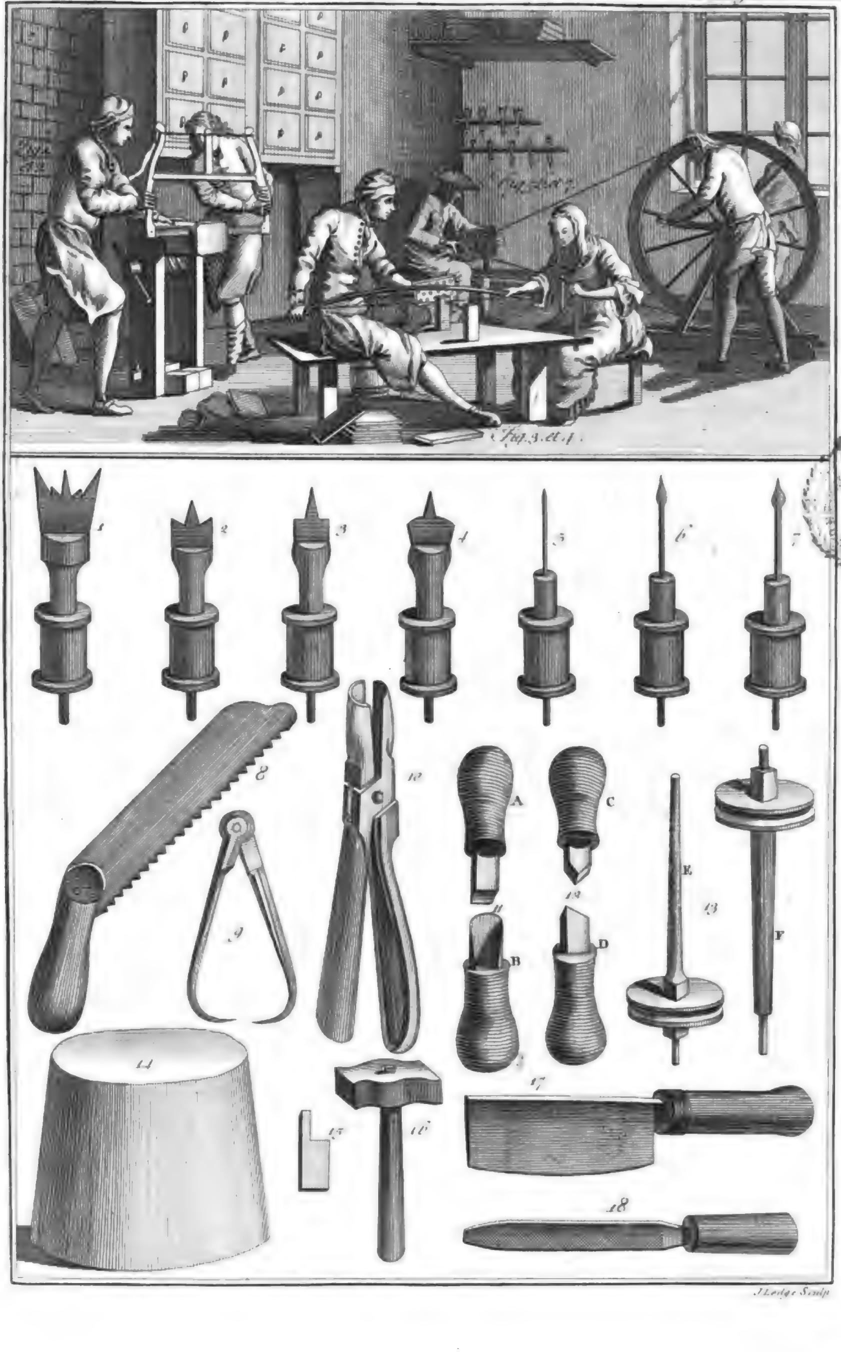
Fig. 3. et 4.
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J. Lodge Sculp.

This difference of opinion probably aroſe from hence, that authors have confounded two very diſtinct vegetables under the name byſſus; the one, the filamentoſe bodies, deſcribed above, which are the only true byſſi; and the other, the duſty matter found on rotten vegetables, conſiſting of ſmall globules. The byſſi are nearly allied to the confervæ; from which however they differ, as conſiſting of finer, ſhorter, and more tender filaments, and not growing in water as the confervæ do.

Byssus, in antiquity, that fine Egyptian linen whereof the tunics of the Jewiſh prieſts were made.

Philo ſays, that the byſſus is the cleareſt and moſt beautiful, the whiteſt, ſtrongeſt, and moſt gloſſy ſort of linen; that it is not made of any thing mortal, that is to ſay, of wool, or the ſkin of any animal, but that it comes out of the earth, and becomes ſtill whiter, and more ſhining, every time it is waſhed as it ſhould be.

BYZANT, or Bezant. See Bezant.

C.

C, The third letter and ſecond conſonant of the alphabet, is pronounced like *k*, before the vowels *a*, *o*, and *u*; but like *s*, before *e* and *i*.

As an abbreviature, C ſtands for Caius, Carolus, Cæſar, *condemno*, *&c.* and C C for *conſulibus*.

As a numeral, C ſignifies 100, C C 200, &c.

C, in muſic, placed after the cliff, intimates, that the muſic is in common time, which is either quick or ſlow, as it is joined with alegro or adagio: if alone, it is uſually adagio.

If the C be croſſed or turned, the firſt requires the air to be played quick, and the laſt very quick.

CAABA, a ſquare ſtone edifice in the temple of Mecca, ſuppoſed to have been built by Abraham and his ſon Iſhmael; being the part principally reverenced by the Mahometans, and to which they always direct themſelves in prayer.

The word is Arabic, caaba, and caabah, a denomination which ſome will have given to this building, on account of its height, which ſurpaſſes that of the other buildings in Mecca; but others, with more probability, derive the name from the quadrangular form of this ſtructure.

The length of the caaba is about twenty-four cubits, its breadth twenty-three, and height twenty-ſeven cubits; the door, which is on the eaſt-ſide, is four cubits from the ground, and the floor level with the bottom of the door. In the corner next this door is the famous black ſtone, which is ſet in ſilver, and exceedingly reſpected by the Mahometans. The pilgrims kiſs it with great devotion, and it is by ſome called the right hand of God on earth. It is fabled to be one of the precious ſtones of Paradiſe, which fell down to the earth with Adam, and being taken up again at the deluge, was brought back by the angel Gabriel to Abraham, when he was building the caaba. It was at firſt whiter than milk, but grew black long ago; ſome ſay by the touch of a menſtruous woman, others by the ſins of mankind, others by the numerous kiſſes of the devotees. On the north-ſide of the caaba, within a ſemicircular incloſure, lies the white ſtone, ſaid to be the ſepulchre of Iſhmael, which receives the rain water that falls off the caaba, by a ſpout formerly of wood, but now of gold. The caaba has a double roof, ſupported within by three octangular pillars of aloes wood, between which, on a bar of iron, hang ſome ſilver lamps. The outſide is covered with rich black damaſk, adorned with an embroidered border of gold, which is changed every year, and was formerly ſent by the caliphs, afterwards by the ſultans of Egypt, but now provided by the Turkiſh emperors. At a ſmall diſtance from the caaba, on the eaſt-ſide, is the ſtation or place of Abraham, where there is another ſtone wherein they pretend to ſhew the footſteps of that patriarch, ſuppoſed to have been made when he ſtood on it in building the caaba, where it ſerved him for a ſcaffold, with this peculiar advantage, that it roſe and fell of itſelf, as he had occaſion.

CAAMINI, in botany, the name by which the Spaniards call the finer kind of paraguay-tea. See the article Paraguay.

CAB, or Kab, a Hebrew meaſure of capacity, equal to the ſixth part of the ſeah, or an eighteenth of the epha.

The cab of wine contained two Engliſh pints; the cab of corn 2 ¾ pints, corn meaſure.

CABALA *Vein*, in natural hiſtory, a name given by our Suſſex miners to one kind of the iron ore commonly wrought in that country. It is a ſtony ore, of a browniſh colour, with a bluſh of red, which is more or leſs conſpicuous in different parts of the ſame maſſes.

CABALLINE denotes ſomething belonging to horſes: thus caballine aloes is ſo called from its being chiefly uſed for purging horſes; and common brimſtone is called ſulphur caballinum for a like reaſon.

CABBAGE, *Braſſica*, in botany, a genus of plants, whoſe characters are: the flower conſiſts of four leaves, and is of the cruciform kind; the piſtil which ariſes from the cup, becomes at length a long cylindrical pod, divided into two cells, which are filled with roundiſh ſeeds, by an intermediate membrane. Tournefort has enumerated twenty-five, and Mr. Miller twenty-two ſpecies of cabbage.

All the common ſorts of cabbages are largely cultivated about London. The common, white, red, flat, and long-ſided ones, are chiefly for winter uſe. The ſeeds of theſe ſorts muſt therefore be ſown in the middle of March, in beds of good freſh earth; and in April, when the young plants will have about eight leaves a-piece, they are to be pricked out into ſhady borders, about three inches ſquare; and about the middle of May they muſt be tranſplanted to the places where they are to remain; and this is commonly between cauliflowers or artichokes, at about two feet diſtance in the rows. They muſt be watered at times, and the earth muſt be hoed up about their roots, and kept clear from weeds.

Theſe cabbages will be fit for uſe ſoon after Michaelmas, and will continue till February, if not deſtroyed by bad weather; to prevent which, the gardeners about London pull up their cabbages about November, and trench the ground in ridges, laying their cabbages againſt the ridges, as cloſe as poſſible on one ſide, burying their ſtems in the ground; and in this manner they let them remain till after Chriſtmas, when they cut them for the market.

The Ruſſian cabbage is ſmall, and not much cultivated now. It is to be raiſed as the others, but may be planted nearer, as not being ſo large. It is fit for uſe in July.

The early Batterſea and ſugar-loaf cabbages are ſown for ſummer uſe, and are commonly called Michaelmas cabbages. The ſeaſon for ſowing theſe is the beginning of July, in an open ſpot of ground. It is common to ſow ſpinage in the ſame beds with theſe, hoeing it up from about their ſtalks in ſpring; in May and June theſe begin to turn their leaves for cabbaging, and may be brought to it much ſooner than naturally they would, by tying them about with an ozier band.

The Savoy cabbages are for winter uſe, and are to be ſown about the beginning of April; they are to be treated as the common cabbage, and planted out at two feet diſtance, in an open place.

The bore-cole may be cultivated in the ſame manner, but muſt be planted only at one foot diſtance; theſe are not fit to cut till the froſts have nipped them.

The method of getting good cabbage ſeed is this: chooſe out ſome fair plants in October, pull them up, and hang them up three days, with the root upward, in a ſhady place; then plant them under a warm hedge, burying the whole ſtalk and half the cabbage in the earth; cover them with culm, if the winter be ſevere, and in ſpring they will ſhoot out many branches. When theſe begin to pod, the ends of the upper ones ſhould be cut off, to give ſtrength to the other pods. The ſeed muſt be preſerved from the birds, by planting ſome lime-twigs about the plants, where the catching one or two will intimidate the reſt. When ripe, it muſt be threſhed out, and kept for uſe. *Miller's Gard. Dict.*

Anjou CABBAGE, a large cabbage ſhrub, which grows in the province of the Lower Mayne in France, where it is cultivated with great advantage. The reader is obliged to the marquis of Turbilly for the following account of the method of cultivating this plant.

"The great Anjou cabbage is one of the moſt uſeful leguminous plants for country people. It will grow in almoſt any ſoil, not excepting even the moſt indifferent, provided it be ſufficiently dunged. It is but little known about Paris, and in many other places, where it might be cultivated to great advantage.

"The ſeeds of this cabbage are commonly ſown in June, in a quarter of good mould in the kitchen garden, which is watered from time to time in caſe of drought. They will riſe pretty ſpeedily, and ſhould be thinned ſoon after, wherever they ſtand too thick. The next care is to keep them free from weeds whilſt they grow, by hoeing the ground between them. At All-Saints, they ſhould be tranſplanted into the field where they are to remain. They ſhould be planted there in trenches dug with a ſpade, pretty deep; that is to ſay, they ſhould be buried almoſt up to the leaves. The diſtance between them ſhould be two feet, or two feet and a half, every way, according to the goodneſs of the ſoil. Particular care ſhould be taken never to plant them with a dibble, as gardeners plant other ſorts of cabbages. A layer of dung ſhould be ſpread along the bottom of the trench, and the roots of the tranſplanted cabbages ſhould be covered therewith. The mould taken out ſhould then be returned back upon this dung; and as the trench will then no longer hold it all, there will remain a ridge between each row of cabbages.

"Towards the middle of the next enſuing month of May, the ground ſhould be well ſtirred between the plants, with a ſpade, or ſome other proper inſtrument, and its whole ſurface ſhould then be laid quite level. After this, nothing more remains to be done, except pulling up the weeds from time to time, as they appear.

"Many huſbandmen ſow the ſeeds of theſe cabbages with thoſe of hemp; and though this way be not ſo ſure as the former, it often ſucceeds very well, eſpecially in wet years. When the hemp is pulled up, a multitude of little cabbages is ſeen, which, having then a freer air, afterwards grow a-pace. They are tranſplanted at All-Saints, in the manner before directed; and are preferred to thoſe of the kitchen garden, becauſe they are not ſo apt to run up to ſeed the next ſpring: for that is an accident which happens ſometimes to ſome of theſe cabbages, in certain years; and it then becomes neceſſary to replace them by others which have not run up, and which are reſerved for this purpoſe in a ſeparate ſpot of ground.

"Several farmers uſe a plough to cut the trench for tranſplanting theſe cabbages: but then they do not remove them till the ſpring, and leave them in the mean while in the place where they were ſown. They afterwards give the earth a ſtirring with a ſpade, and lay it ſmooth, towards the end of May, in the manner before directed. In many farms in Anjou and Poitou, whole fields of theſe cabbages are ſeen, which are a very great reſource.

"In the month of June, ſuch of theſe cabbages which are already large, as do not turn in their leaves for cabbaging, but ſtill continue green, begin to be fit for uſe, and ſoon arrive at their greateſt perfection, which they retain till the next ſpring, when they begin to run up, and afterwards bloſſom. Their ſeeds ripen toward the beginning of July; and what is intended for ſowing ſhould be gathered then.

"In Anjou, when theſe cabbages are entirely run up, they generally grow to the height of ſeven or eight feet: ſometimes they reach to eight feet and a half high, or nine feet; and even yet taller ones have been ſeen.

"From the month of June, when theſe cabbages begin to be fit for uſe, their leaves are gathered from time to time, and they ſhoot out again. They are large, excellent for ſoup, and ſo tender that they are boiled in a very ſhort ſpace of time. They never occaſion any flatulence, or uneaſineſs in the ſtomach; and they are alſo very good food for cattle, which eat them greedily. They likewiſe increaſe greatly the milk of cows.

"Such are the properties of this kind of cabbage, greatly eſteemed in Anjou, Poitou, Brittany, the Mayne, and ſome other neighbouring provinces. In Anjou, farmers are even bound by their leaſes, to plant yearly a certain number of theſe cabbages, and to leave a certain number of them ſtanding when they quit their farms.

"This cabbage forms a kind of ſhrub, the great utility of which may be gathered from this; that its leaves afford nouriſhment to men and cattle, and its ſtalk, which is about the thickneſs of one's wriſt, is uſed for fuel, when dry. It therefore is a common ſaying in Anjou, that every one of the cabbages is worth five ſols, or two-pence halfpenny Engliſh, a year.

"It ſometimes happens in extremely ſevere winters, that ſome of theſe cabbages are frozen; and this is looked upon as a great loſs, in the countries already mentioned; but that accident is rare, becauſe this kind of cabbage reſiſts froſt better than moſt others.

"The ground where theſe cabbages are planted ſhould be fenced in very carefully, by hedges, or ditches, in order to preſerve them from the depredations of cattle, which are extremely fond of them. With this precaution, I have made ſeveral plantations of them near the houſes which I have built in the midſt of the heaths and commons that I have broken up and improved; and they have ſucceeded well, though the ſoil is but very indifferent in many places.

"I have, near my houſe in Anjou, two well incloſed fields, deſtined for this ſort of plantation. They are planted alternately, every year, with young cabbages: when theſe are pulled up, after they have ſeeded, in the ſecond year, at the time beforementioned, the ground where they ſtood is dug up, and ſowed with peas or beans, the crop of which, being taken off before All-Saints, makes room for planting of new cabbages at the proper ſeaſon. The ſoil is looſened and enriched by the peas and beans, and by this means the land never is reſted; nor is it ever exhauſted, becauſe it is dunged whenever the cabbages are planted.

"Theſe cabbages are of ſuch excellent ſervice to me, that I have often wondered at their not being cultivated in all the different countries in Europe. I believe they would ſucceed every where; and I adviſe all huſbandmen to make plantations of them. As their ſeeds are not yet ſold at Paris, the beſt way will be to procure them from one or other of the above-named provinces; and there, to be the ſurer of them, from actual farmers.

"I wiſh that this ſhort memoir, founded on my own experience, may contribute to extend the culture of this very uſeful plant."

CABBAGE-TREE, *palma maxima*, or *palmeto royal*, a very beautiful tree, common in ſeveral parts of America.

It has acquired the name of royal from its remarkable height, majeſtic appearance, and elegance of its waving foliage: neither the tall cedars of Lebanon, nor any of the trees of the foreſt, are equal to it in height, beauty, or proportion.

Its roots are innumerable, reſembling ſo many round thongs, of a regular determinative bigneſs, ſeldom exceeding the ſize of the little finger, but of a great length, penetrating ſome yards into the earth, eſpecially where the ſoil is ſandy, or otherwiſe porous: theſe roots are of a dark-brown colour.

The trunk jets or bulges out a little near the ground, by which means it hath the becoming appearance of a ſubſtantial baſis to ſupport its towering height. It is generally as ſtraight as an arrow; and ſcarce can a pillar of the niceſt order in architecture be more regular, eſpecially when it is of about thirty years growth: and as there is a natural involuntary pleaſure ariſing from the harmony of juſt geometrical proportions, ſtriking the eye of the moſt unſkilful and ignorant beholder, it is not ſtrange that theſe trees are univerſally admired.

Writers of wonders repreſent ſome of them to be three hundred feet in height: however, Mr. Hughes informs us, that in Barbadoes, where they are more numerous than in the other iſlands, that they do not exceed one hundred and thirty-four feet.

The trunk of this tree, near the earth, is about ſeven feet in circumference, the whole body growing tapering to the top.

The ſubſtance of the tree, for about two or three inches of the outſide, but within the bark, is of a blackiſh colour, and extremely hard and ſolid: this ſurrounds the inner ſubſtance, which is a whitiſh pith, intermixed with ſome ſmall veins of a more ligneous texture.

The colour of the bark much reſembles that of an aſh-tree, and is very faintly clouded, at about the diſtance of every four or five inches, with the veſtigia of the fallen-off branches: this colour of the bark continues till within about twenty-five or thirty feet of the extremity of the tree: there it alters at once from an aſh-colour to a beautiful deep ſea-green, and continues to be of that colour to the top.

About five feet from the beginning of the green part upwards, the trunk is ſurrounded with its numerous branches in a circular manner; all the lowermoſt ſpreading horizontally with great regularity; and the extremities of many of the higher branches bend wavingly downwards, like ſo many plumes of feathers. Theſe branches, when full-grown, are twenty feet long, more or leſs; and are thickly ſet on the trunk alternately, riſing gradually ſuperior one to another: their broad curved ſockets ſo ſurround the trunk, that the ſight of it, whilſt among theſe, is loſt, which again appears among the very uppermoſt branches, and is there inveloped in an upright green conic ſpire, which beautifully terminates its great height.

The abovementioned branches are ſomewhat round underneath, and ſlightly grooped on the upper ſide: they are likewiſe decorated with a very great number of green pennated leaves; ſome of theſe are near three feet long, and an inch and an half broad, growing narrower towards their points, as well as gradually decreaſing in length towards the extremities of the branches.

As there are many thouſand leaves upon one tree, every branch bearing many ſcores upon it, and every leaf being ſet at a ſmall and equal diſtance from one another, the beauty of ſuch a regular lofty group of waving foliage, ſuſceptible of motion by the moſt gentle gale of wind, is not to be deſcribed.

The middle rib, in each leaf, is ſtrong and prominent, ſupporting it on the under ſide, the upper appearing ſmooth and ſhining. The pithy part of the leaf being ſcraped off, the inſide texture appears to be ſo many longitudinal thread-like filaments.

Theſe being ſpun in the ſame manner as they do hemp, or flax, are uſed in making cordage of every kind, as well as fiſhing-nets, which are eſteemed ſtronger than thoſe uſually made from any other material of the like nature.

It is obſerved, that the lowermoſt branch, for the time being, drops monthly from the tree, carrying with it an exfoliated circular lamen of the green part of the tree, from the ſetting on of the branches, to the aſh-colour part, which is about five feet in length, and in breadth the circumference of the tree at that part. This and the branch to which it is always fixed, fall together.

When the loſs of this lower branch happens, then the green conic ſpire, which iſſues from among the center of the uppermoſt branches, and riſes ſuperior to all, partially burſts, and thruſts from its ſide a young branch, which continues the uppermoſt, till another of the lowermoſt branches drop off: then the ſpire, the common parent of all the branches, ſends forth again another branch, ſuperior in ſituation to the laſt; ſo that the annual loſs of the branches below is providentially ſupplied in this manner by thoſe above.

The green-coloured part of the tree, already mentioned, differs from the aſh-coloured part no leſs in ſubſtance than colour; the former, inſtead of being extremely hard on the outſide, and pithy within, is compoſed of ſo many coats, or ſeparate laminæ, of a tough bark-like ſubſtance, of near a quarter of an inch thick, and ſo very cloſely wrapped together, that they jointly compoſe and conſtitute that green part of the tree.

As the lowermoſt, as well as each other higher branch, when they ſucceſſively grow to be old, is joined by the broad ſocket of its foot-ſtalk to this outward coat, lamen, or folding, it is obſervable, that ſome time before the lowermoſt branch is entirely withered, this green circular coat, which to the eye appeared ſome days before to be a ſolid part of the tree, ſlits open lengthwiſe, from the ſetting on of the branches to the aſh-coloured part beneath, being about five feet in length, and the circumference of the tree in the breadth; and, peeling off, it falls with the falling branch to which it is joined by many ſtrong cartilages, leaving the next ſucceeding coat to appear for a time as a conſtituent part of the tree, till a ſucceeding withered branch carries this off likewiſe.

Mr. Hughes farther informs us, that having felled one of theſe ſtately trees, to examine its make, texture, &c. he obſerved, that the ſeveral exfoliations of its green part were equal in number to the branches.

The firſt, ſecond, third, and ſometimes the fourth of theſe laminæ are green on the outſide, and perfectly white within: all the remaining inner coats, or foldings, are of a bright lemon-colour without, and white within.

When theſe very tough huſky exfoliations are taken off, what is called the cabbage, lies in many thin, ſnow-white, brittle flakes; in taſte ſomething like the kernel of an almond, but ſweeter: it is ſo full of oil, that a curious obſerver may ſee ſeveral very ſmall cells abounding with it. Theſe flakes are called, from ſome reſemblance, when boiled, the cabbage, which then eats ſomewhat ſweet and agreeable.

What is called the cabbage-flower, grows from that part of the tree where the aſh-coloured trunk joins the green part already deſcribed. Its firſt appearance is a green huſky ſpatha, growing to above twenty inches long, and about four broad; the inſide being full of ſmall white ſtringy filaments, full of alternate protuberant knobs, the ſmalleſt of theſe reſembling a fringe of coarſe white thread knotted: theſe are very numerous, and take their riſe from larger footſtalks; and theſe footſtalks likewiſe are all united to different parts of the large parent ſtalk of all.

As this huſky ſpatha is opened, while thus young, the farinaceous yellow ſeed, in embryo, reſembling fine ſawduſt, is very plentifully diſperſed among theſe ſtringy filaments, which anſwer the uſe of apices in other more regular flowers: theſe filaments, being cleared of this duſt, are pickled, and eſteemed among the beſt pickles in Europe.

But if this ſpatha is not cut down and opened, whilſt thus young, if it be ſuffered to continue on the tree till it grows wild and burſts; then the incloſed part, which, whilſt young and tender, is fit for pickling, will by that time have acquired an additional hardneſs, become ſoon after ligneous, grow buſhy, conſiſting of very ſmall leaves, and in time produce a great number of ſmall oval thin-ſhelled nuts, about the bigneſs of unhuſked coffee-berries: theſe, being planted, produce young cabbage-trees.

CABBAGING, among gardeners, a term uſed for the knitting of cabbages into round heads. See the article CABBAGE.

CABBALA, among the Jews, is properly the myſtical interpretations of their ſcriptures, handed down by tradition.

The word is Hebrew, and literally ſignifies traditions.

The manner in which Maimonides explains the cabbala, or traditions of the Jews, is as follows: "God not only delivered the law to Moſes on Mount Sinai, but the explanation of it likewiſe. When Moſes came down from the Mount, and entered into his tent, Aaron went to viſit him, and Moſes acquainted Aaron with the laws he had received from God, together with the explanation of them. After this, Aaron placed himſelf at the right hand of Moſes, and Eleazar and Ithamar, the ſons of Aaron, were admitted; to whom Moſes repeated what he had juſt before told Aaron. Theſe being ſeated, the one on the right, the other on the left band of Moſes, the ſeventy elders of Iſrael, who compoſed the Sanhedrim, came in. Moſes again declared the ſame laws to them, with the interpretations of them, as he had done before to Aaron and his ſons. Laſtly, all who pleaſed of the common people were invited to enter; and Moſes inſtructed them likewiſe in the ſame manner as the reſt: ſo that Aaron heard four times what Moſes had been taught by God upon Mount Sinai; Eleazar and Ithamar three times; the ſeventy elders twice; and the people once. Moſes afterwards reduced the laws, which he had received, into writing, but not the explanations of them: theſe he thought it ſufficient to truſt to the memories of the above-mentioned perſons, who, being perfectly inſtructed in them, delivered them to their children, and theſe again to theirs, from age to age."

The cabbala therefore is, properly, the oral law of the Jews, delivered down, by word of mouth, from father to ſon: and it is to theſe interpretations of the written law our Saviour's cenſure is to be applied, when he reproves the Jews for "Making the commands of God of none effect through their traditions."

Some of the rabbins pretend, that the origin of the cabbala is to be referred to the angels; that the angel Raziel inſtructed Adam in it; the angel Japhiel Shem; the angel Zedekiel Abraham, &c. But the truth is, theſe explications of the law are only the ſeveral interpretations and deciſions of the rabbins on the law of Moſes; in the framing of which they ſtudied principally the combinations of particular words, letters, and numbers, and by that means pretend to diſcover clearly the true ſenſe of the difficult paſſages of Scripture.

This is properly called the artificial cabbala, to diſtinguiſh it from ſimple tradition; and it is of three ſorts. The firſt, called gematria, conſiſts in taking letters as figures, and explaining words by the arithmetical value of the letters of which they are compoſed. For inſtance, the Hebrew letters of Jabo-Schiloh, "Shiloh ſhall come," make up the ſame arithmetical number as Meſſiach, "the Meſſiah;" from whence they conclude, that Shiloh ſignifies the Meſſiah.

The ſecond kind of artificial cabbala, which is called notaricon, conſiſts in taking each particular letter of a word for an entire diction. For example, of Bereſchith, which is the firſt word of Geneſis, compoſed of the letters B.R.A.SCH.JT. they make Bara-Rakia-Arez-Schamaim-Jam-Tehomoth; that is, "He created the firmament, the earth, the heavens, the ſea, and the deep;" or in forming one entire diction out of the initial letters of many: thus, in Atah-Gibbor-Leholam-Adonai, "Thou art ſtrong for ever, O Lord," they put the initial letters of this ſentence together, and form the word Agla, which ſignifies, "I will reveal, or a drop of dew," and is the cabbaliſtic name of God.

The third kind, called themura, conſiſts in changing and tranſpoſing the letters of a word: thus of the word Bereſchith, the firſt of the book of Geneſis, they make A-betiſri, the firſt of the month Tiſri, and infer from thence, that the world was created on the firſt day of the month Tiſri, which anſwers very nearly to our September.

The cabbala, according to the Jews, is a noble and ſublime ſcience, conducting men by an eaſy method to the profoundeſt truths. Without it, the Holy Scriptures could not be diſtinguiſhed from prophane books, wherein we find ſome miraculous events, and as pure morality as that of the law, if we did not penetrate into the truths locked up under the external cover of the literal ſenſe. As men were groſsly deceived, when, dwelling upon the ſenſible object, they miſtook angels for men; ſo alſo they fall into error or ignorance, when they inſiſt upon the ſurface of letters or words, which change with cuſtom, and aſcend not up to the ideas of God himſelf, which are infinitely more noble and ſpiritual.

Some viſionaries among the Jews, believe that Jeſus Chriſt wrought his miracles by virtue of the myſteries of the cabbala. Some learned men are of opinion, that Pythagoras and Plato learned the cabbaliſtic art of the Jews in Egypt: others, on the contrary, ſay, the philoſophy of Pythagoras and Plato furniſhed the Jews with the cabbala. Moſt of the heretics, in the primitive Chriſtian church, fell into the vain conceits of the cabbala; particularly the Gnoſtics, Valentinians, and Baſilidians.

CABBALISTS, thoſe Jewiſh doctors who profeſs the ſtudy of the cabbala. In the opinion of theſe men, there is not a word, letter, or accent, in the law, without ſome myſtery in it. The firſt cabbaliſtical author that we know of, is Simon, the ſon of Joachai, who is ſaid to have lived a little before the deſtruction of Jeruſalem by Titus. His book, entitled Zohar, is extant; but it is agreed that many additions have been made to it. The firſt part of this work is entitled Zenintha, or Myſtery; the ſecond Idra Rabba, or the Great Synod; the third Idra Lata, or the Little Synod, which is the author's laſt adieu to his diſciples. See RABBINS.

CABECA, or CABESSE, a name given to the fineſt ſilks in the Eaſt-Indies, as thoſe from 15 to 20 per cent. inferior to them are called barina. The Indian workmen endeavour to paſs them off one with the other; for which reaſon the more experienced European merchants take care to open the bales, and to examine all the ſkains one after another.

CABIN, in naval architecture, an apartment in a ſhip for any of the officers to eat, drink, and ſleep in.

The great cabin is chiefly intended for the captain or principal officer; but there are beſides theſe ſeveral of a ſmaller kind for the inferior officers. The bed-places of the ſailors, if they are built up at the ſhip's-ſide between decks, which is often the caſe in merchant ſhips, are likewiſe denominated cabins.

CABINET, a piece of joiners workmanſhip. It is a kind of preſs or cheſt, with ſeveral doors and drawers, to lock up the moſt precious things, or only to ſerve as an ornament in chambers, galleries, or other apartments.

There are common cabinets of oak, or of cheſnut; varniſhed cabinets of China and Japan; cabinets of inlaid work; ſome of ebony, and other ſcarce and precious woods.

The cabinets of Germany were formerly in great repute in France, where they were very much eſteemed on account of ſeveral mechanical rarities and curioſities, which they were filled with in the inſide. They are very much valued in foreign countries; and the Dutch carry ſome ſtill into the Eaſt; but they are almoſt entirely out of uſe in France, as well as the cabinets of ebony, which come from Venice.

CABINET, in a garden, is a conveniency which differs from an arbour in this; that an arbour or ſummer-houſe is of a great length, and arched over head, in the form of a gallery; but a cabinet is either ſquare, circular, or in cants, making a kind of ſaloon to be ſet at the ends or in the middle of a long arbour.

CABINET *of natural Hiſtory*, a building containing all the curioſities of nature, digeſted in a proper manner.

Such a building might indeed be called, with more propriety, a muſæum or repoſitory; cabinet here, therefore, muſt be underſtood in a larger ſenſe than the common acceptation of the word, as herein are exhibited to our view the animal, vegetable, and mineral kingdoms at once: in ſhort, an epitome of nature.

It is not certain whether the ancients ever formed any collections of this kind, or erected any ſtructures for the reception and diſpoſition of them. But it is not improbable, that Ariſtotle, ſupported by the generoſity and magnificence of Alexander the Great, built ſomething of this kind, at leaſt with regard to animals; becauſe the obſervations he has left us, are undoubtedly the reſult of anatomical obſervations; and the remarks he has made on the various ſpecies of animals, ſhew our knowledge, even ſince the revival of letters, to be vaſtly inferior to his in this reſpect.

The knowledge of natural hiſtory improves, as collections of this kind are made more perfect; and our own age has firſt ſet on foot eſtabliſhments that deſerve the name of cabinets of natural hiſtory.

CABIRI, a term in the theology of the ancient pagans, ſignifying great and powerful gods; being a name given to the gods of Samothracia. They were alſo worſhipped in other parts of Greece, as Lemnos and Thebes, where the cabiria were celebrated in honour of them: theſe gods are ſaid to be, in number, four, viz. Axieros, Axiocerſa, Axiocerſus, and Caſmilus.

CABIRIA, feſtivals in honour of the cabiri, celebrated in Thebes and Lemnos, but eſpecially in Samothracia, an iſland conſecrated to the cabiri. All who were initiated into the myſteries of theſe gods were thought to be ſecured thereby from ſtorms at ſea, and all other dangers. The ceremony of initiating was performed, by placing the candidate, crowned with olive branches, and girded about the loins with a purple ribbon, on a kind of throne, about which the prieſts and perſons before initiated, danced.

CABLED, in heraldry, a term applied to a croſs, formed of the two ends of a ſhip's cable; ſometimes alſo to a croſs covered over with rounds of rope, more properly called a croſs-corded.

CABLES, in naval affairs, thick ſtrong ropes, compoſed of hemp, baſs, or Indian graſs: they are uſed to retain a ſhip at anchor in a proper place, where ſhe may want to remain. See Anchor.

All ſhips have or ought to have at leaſt three cables, the ſheet cable, and the two bowers, beſt and ſmall.

Cable is alſo ſaid of ropes which ſerve to raiſe heavy loads by the help of cranes, pullies, and other engines. The name of cable is uſually given to ſuch as have at leaſt three inches in diameter.

Every cable, of what thickneſs ſoever, is compoſed of three ſtrands, each of which is formed of three ſmaller ſtrands, and each of thoſe of a certain number of rope-yarns, which is more or leſs in proportion to the ſize of the cable.

The number of threads each cable is compoſed of being thus always proportioned to its length and thickneſs, its weight and value are determined by this number of threads: thus a cable of nine inches in circumference ought to conſiſt of three hundred and ninety-three rope-yarns, and weigh one thouſand five hundred and ſeventy-two pounds; and on this foundation is calculated the following table, very uſeful for all perſons engaged in marine commerce, who fit out merchantmen on their own account, or freight them for the account of others.

A Table of the number of threads and weight of cables of different circumferences.

Circumference in inches.	Threads, or rope-yarns.	Weight in pounds.
9	393	1572
10	485	1940
11	598	2392
12	699	2796
13	821	3284
14	952	3808
15	1093	4372
16	1244	4976
17	1404	5616
18	1574	6296
19	1754	7016
20	1943	7772

To ſerve the Cable is to bind it about with ropes or other materials to keep it from being galled or chafed in the hawſe. See Hawſe.

Splicing the Cable is to interweave the ends of two cables together, or the two ends of one that had been broke.

Pay away the Cable is to let more out of the ſhip.

CABOCHED, in heraldry, is when the heads of beaſts are borne without any part of the neck, full-faced.

CACAO, the chocolate-tree, in botany, a genus of trees, called by Linnæus theobroma. See Theobroma.

The fruit of this tree is an oblong roundiſh nut, nearly of the ſhape of an almond, but larger: the ſhell is dark-coloured, brittle, and thin: the kernel is both externally and internally browniſh, divided into ſeveral unequal portions, which are joined firmly together. It is the produce of a ſmall American tree, bearing a large red fruit, ſhaped like a cucumber, which contains thirty or more of the nuts. There are ſeveral ſorts of theſe nuts in the ſhops, diſtinguiſhed by their ſize, and the places whence they are brought: the larger kind, from the province of Nicaragua in Mexico, is moſt eſteemed.

Cacao nuts have a light agreeable ſmell, and an unctuous, bitteriſh, roughiſh, not ungrateful taſte: thoſe of Nicaragua and Caracco are the moſt agreeable; thoſe of the French Antilles, and our own American iſlands, the moſt unctuous. All the ſorts, thoroughly comminuted and committed to the preſs, yield a conſiderable quantity of a fluid oil, of the ſame general qualities with thoſe obtained from other ſeeds and kernels: boiled in water, they give out a large proportion, half their weight or more, of a ſebaceous matter, which gradually concretes upon the ſurface as the liquor cools. For obtaining this product to the beſt advantage, the faculty of Paris directs the nuts to be ſlightly roaſted in an iron pan, cleared from the rind and germ, levigated on a hot ſtone, then diluted with a proper quantity of hot water, and kept in a water bath till the oil riſes to the top; which, when concreted, looks brown, and by repeated liquefactions in hot water becomes white. This vegetable ſerum is not liable to grow rancid in long keeping; and hence is recommended as a baſis for odoriferous unguents and the compoſitions called apoplectic balſams.

The principal uſe of theſe nuts is for the preparation of the dietetic liquor, chocolate; a mild unctuous fluid, ſuppoſed to be ſerviceable in conſumptive diſorders, emaciations, and an acrimonious ſtate of the juices in the firſt paſſages. See Chocolate.

CACHEXIA, of κακος, bad, and ἑξις, habit, an univerſal bad habit of body, proceeding from a defect in nutrition, which muſt ariſe either from a depravation of the nutritious juices, or a defect in the veſſels which ought to receive theſe juices; or a deficiency in that action of the animal œconomy, by which a part of the circulating juices is applied to the ſolids for their nutrition.

The nutritious juices are depraved by aliments which are ſuperior to the powers of digeſtion; that is, which cannot be digeſted and aſſimilated by the proper organs. Of this ſort are all crude, farinaceous, and legumine vegetables, which, on a weak ſtomach, are ſubject to form a kind of tenacious paſte. Add to theſe all ſorts of food which are hard, fibrous, fat, acrid, aqueous, and viſcid. Among theſe may juſtly be reckoned ſome indigeſtible ſubſtances, which depraved appetites ſometimes covet, as cinders, chalk, ſand, or lime.

It muſt however be remarked, that the aliments above-mentioned will not be ſubject to induce a cachexy, provided the organs of digeſtion are ſufficiently ſtrong, and proportional exerciſe is uſed by the perſon who takes them. Hence other cauſes of the depravation of the nutritious juices muſt be joined to the preceding, as a deficiency, with reſpect to animal motion or exerciſe, and debility of the digeſtive organs; though a too great tenſion thereof may have the ſame effects, if ſufficient to interfere with the ſolution and aſſimilation of the aliment.

If the general maſs of blood alſo happens to be vitiated extremely in any manner whatever, the nutritious juices muſt, in proportion, be depraved.

Theſe defects, in the organs of digeſtion, are brought about in various manners; as by all profuſe ſecretions of what kind ſoever, as violent vomitings, diarrhœas, dyſenteries, or hæmorrhages; by a ſcirrhous diſorder of any of the viſcera; or by a retention of ſomething in the body which ought to be excreted.

It is evident that theſe cauſes united, act either by diminiſhing the ſolids, or by diſtending them with fluids not adapted to circulate through them. Hence ariſe two ſorts of diſeaſes; that is, a conſumption, and what is uſually called a leucophlegmatia, or an anaſarca.

According to the different colour, bulk, tenacity, acrimony, and fluidity of the ſtagnating liquids, various appearances ariſe, which may be eſteemed ſymptoms of a cachexy. Thus, the ſkin appears white, yellow, livid, red, green, black, or tawny; the patient perceives a ſenſation of gravity; tumours ariſe under the eyes, and affect the more thin parts of the body. Add to theſe flatulencies and œdematous tumours of the parts remote from the heart; palpitations of the heart and arteries, which are augmented by the leaſt motion; crude and thin urine; ſpontaneous and evidently watery ſweats; all which are ſucceeded by emaciation of a leucophlegmatia, and dropſy.

No univerſal defect of the veſſels, which ought to receive good nutritions, can be aſſigned; but their too great contraction or laxity, and the conſequences thereof, may be admitted as cauſes of theſe defects.

There is a deficiency in that action of the animal œconomy, by which a part of the juices is applied to the ſolids, whenever the force of the circulation is either too languid, or too violent.

From what has been ſaid, a cachexy may be eaſily diſtinguiſhed: and as to the conſequences thereof, they may be foreſeen, by carefully conſidering the cauſe, ſtanding effects, and degrees of the diſorder. To all theſe the method of cure muſt be carefully adapted; for it is evident that a mitigation, or moderate inſpiſſation, of the too acrid and too fluid juices, are ſometimes required; and in other caſes, the tenaceous and adhering juices muſt be reſolved and rendered fluid: and as a diſſolution and an inſpiſſation of the juices may be induced by various cauſes, it will be neceſſary to vary the medicines, and the manner of applying them, as the different cauſes ſhall determine.

But the principal rules to be obſerved in the cure are,

Firſt, to adminiſter ſuch aliment as approaches nearly to the nature of the healthful fluids of the body, which are eaſily digeſtible; which are in their nature oppoſite to the cauſe of the diſorder; and which are agreeable to the patient.

Secondly, to promote the digeſtion of ſuch aliments, by ſeaſoning them with proper aromatics; by drinking proper quantities of generous wine; and by exerciſe and air.

Thirdly, to diſpoſe the organs of digeſtion to perform their duties by proper gentle digeſtives, vomits, purges, and corroborants.

Fourthly, as ſoon as the paſſages are relaxed, and the morbid matter is attenuated, to promote its expulſion, by attenuating diuretics and ſudorifics.

Laſtly, to complete the cure by chalybeats, alkaline and ſaponaceous ſubſtances, together with walking, riding, or other proper exerciſes, frictions, and baths.

The cauſe, however, of this diſtemper only can determine the choice of all theſe, and the manner of applying them.

When a cachectic conſumption ariſes from too great an acrimony of the juices, the particular ſpecies of acrimony muſt, if poſſible, be diſcovered.

Firſt, by inveſtigating the cauſe of the cachexy.

Secondly, by examining into the nature of the diſeaſe, and the conſtitution of the patient.

Thirdly, by the ſymptoms.

Fourthly, by the excretions.

And when the nature of the prevailing acrimony is known, it muſt be corrected by ſubſtances of a contrary nature. *Boer. Aph.*

CACHRYS, in botany, a genus of plants, the general flower of which is uniform; the proper flowers conſiſt of five lanceolated, equal, and ſomewhat erect petals; the fruit is roundiſh, angulated, obtuſe, very large, and ſeparable into two parts, with two ſeeds very large, very convex on one ſide, and plane on the other; fungous, and containing a ſingle ovato-oblong nucleus.

CACŒTHES, in medicine, an epithet applied, by Hippocrates, to malignant and difficult diſtempers: when applied to ſigns or ſymptoms, it imports what is very bad and threatening; and if given to tumours, ulcers, &c. it denotes a great malignancy.

CACTUS, in botany, a genus of plants, comprehending the torch-thiſtle, melon-thiſtle, pereſkia, and cochineal plant; the flower of which conſiſts of a great many broad obtuſe petals; the exterior ones ſhort, and the interior ones long and connivent: the fruit is an oblong umbilicated berry, covered with little leaves, like the cap, with one cell, containing numerous, roundiſh, and ſmall ſeeds.

This is a culinary plant, which is blanched like celery, and, like that, eaten raw with pepper and ſalt in Italy. In the medicinal virtues, it agrees with the cynara, or artichoke.

CADARI, or KADARI, a ſect of Mahommedans, who attribute the actions of men to man alone, and not to the divine decree determining his will; and deny all abſolute decrees and predeſtination. Ben Aun calls the cadari, the magi or manichees of the Muſſulmen.

CADE, a cag, caſk, or barrel. A cade of herrings is a veſſel containing the quantity of five hundred red herrings, or of ſprats one thouſand.

CADE-LAMB, a young lamb, weaned and brought up by hand in a houſe.

CADE-OIL, an oil much uſed in France and Germany. It is prepared from the fruit of a ſpecies of cedar, called oxycedrus.

CADENCE, in muſic, according to the ancients, is a ſeries of a certain number of notes, in a certain interval, which ſtrike the ear agreeably, and eſpecially at the end of the ſong, ſtanza, &c. It conſiſts ordinarily of three notes.

Cadence, in the modern muſic, may be defined a certain concluſion of a ſong, or of the parts of a ſong, which divide it, as it were, into ſo many numbers or periods. It is when the parts terminate in a chord or note, the ear ſeeming naturally to expect it; and is much the ſame in a ſong as the period that cloſes the ſenſe in a paragraph of a diſcourſe.

A cadence is either perfect, conſiſting of two notes ſung after each other, or by degrees, conjoined in each of the two parts, and by theſe means ſatisfying the ear; or imperfect, when its laſt meaſure is not in the octave or uniſon, but a ſixth or third. It is called imperfect, becauſe the ear does not acquieſce in the concluſion, but expects a continuation of the ſong. The cadence is ſaid to be broken, when the baſs, inſtead of falling a fifth, as the ear expects, riſes a ſecond, either major or minor. Every cadence is in two meaſures; ſometimes it is ſuſpended, in which caſe it is called a repoſe, and only conſiſts of one meaſure, as when the two parts ſtop at the fifth, without finiſhing the cadence. With regard to the baſs-viol, Mr. Rouſſeau diſtinguiſhes two cadences, one with a reſt, when the finger, that ſhould ſhake the cadence, ſtops a little, before it ſhakes, on the note immediately above that which requires the cadence; and one without a reſt, when the ſtop is omitted.

All cadences are to be accommodated to the characters of the airs.

Cadence, with ſome French muſicians, is ſynonymous with a ſhake. See SHAKE.

CADENCE, in the menage, an equal meaſure or proportion obſerved by a horſe in all his motions; ſo that his times have an equal regard to one another, the one does not embrace or take in more ground than the other, and the horſe obſerves his ground regularly.

CADENCE, in rhetoric and poetry, the running of verſe or proſe, otherwiſe called the numbers, and by the ancients, ρυθμος. See the article RHYTHMUS.

It would be eaſy to give inſtances, both in our own, as well as the Greek and Roman poets, when the cadence is admirably adapted to the ſubject in hand.

CADENE, one of the ſorts of carpets which the Europeans import from the Levant. They are the worſt ſort of all, and are ſold by the piece from one to two piaſters per carpet.

CADET, a military term denoting a young gentleman who chooſes to carry arms in a marching regiment, as a private man. His views are to acquire ſome knowledge in the art of war, and to obtain a commiſſion in the army. Cadet differs from volunteer, as the former takes pay, whereas the latter ſerves without any pay.

CADI, or Cadhi, a judge of the civil affairs in the Turkiſh empire.

It is generally taken for the judge of a town, judges of provinces being diſtinguiſhed by the appellation of mollas.

In Biledulgerid, in Africa, the cadi decides in ſpiritual affairs.

CADILESCHER, a capital officer of juſtice, among the Turks, anſwering to a chief juſtice among us.

CADMIA, in the natural hiſtory of the ancients, the name of two diſtinct ſubſtances called native cadmia, and factitious cadmia. The native cadmia was only one of the copper ores; the factitious cadmia was a recrement of copper, produced in the copper works.

Amoug the modern writers, it is not unuſual to confound theſe ſubſtances with tutty. See the article Tutty.

CADUCEUS, in antiquity, Mercury's rod, or ſceptre, being a wand entwiſted by two ſerpents, borne by that deity, as the enſign of his quality and office, given him, according to the fable, by Apollo, for his ſeven-ſtringed harp.

CÆCILIA, in zoology, the name of a genus of ſerpents, the characters of which are theſe: the body is naked with wrinkled ſides; the upper lip is prominent beyond the reſt of the mouth, and has two tentacula; it has no tail.

Of this genus, authors enumerate ſeveral ſpecies, diſtinguiſhed by the number of their rugæ or wrinkles.

CÆCUM, or Coecum, in anatomy, the blind gut, or firſt of the thick inteſtines. Of the three large inteſtines, called from their ſize, inteſtina craſſa, the firſt is the cæcum, ſituated at the right os ileum; it reſembles a bag, and has a vermiform or worm-like appendage fixed to it. It begins at the termination of the ileum, and terminates in the bottom of the bag, or ſacculus, which it forms: its length is no more than three or four fingers breadth. In the appendage, or opening into the ſide of the cæcum, there are ſome glands, which, together with its erect ſituation, ſeems to ſhew that ſome fluid is ſecreted there. In hens, this is double; as alſo in many other fowls. In fiſhes, there are frequently a vaſt number of them; and in ſome ſpecies not leſs than four hundred. In man it is, at the utmoſt, ſingle, and is often wanting.

CÆMENT. See Cement.

CÆMENTATION. See Cementation.

CÆSAR, in Roman antiquity, a title borne by all the emperors, from Julius Cæſar to the deſtruction of the empire. It was alſo uſed as a title of diſtinction, for the intended or preſumptive heir of the empire, as king of the Romans is now uſed for that of the German empire.

This title took its riſe from the ſurname of the firſt emperor, C. Julius Cæſar, which, by a decree of the ſenate, all the ſucceeding emperors were to bear. Under his ſucceſſor, the appellation of Auguſtus being appropriated to the emperors, in compliment to that prince, the title of Cæſar being given to the ſecond perſon in the empire, though ſtill it continued to be given to the firſt; and hence the difference betwixt Cæſar uſed ſimply, and Cæſar with the addition of Imperator Auguſtus.

CÆSARIAN Section, in midwifry, a chirurgical operation, by which the fœtus is delivered from the womb of its mother, when it cannot be done in the natural way.

There are chiefly three different caſes in which this operation is practicable; the firſt is, when the mother is dead, either in the birth, or by ſome accident, while the fœtus is reaſonably ſuppoſed to be yet ſurviving in the womb: the ſecond is, when the mother is living, and the fœtus dead, but incapable of being extracted or expelled by the natural paſſages; the third and laſt is, when the mother and fœtus are both living, but the latter is incapable of being brought into the world through the natural paſſages.

In the firſt caſe, this operation ſhould be performed, not only as ſoon as poſſible, but even before the circulation in the mother is ſtopped, becauſe the fœtus cannot long ſurvive: then the abdomen muſt be laid open, by a crucial inciſion, as in common diſſections, or by making a longitudinal inciſion on one ſide; and if the fœtus ſhould have fallen into the cavity of the abdomen, from a rupture of the uterus, &c. it ſhould be taken out immediately; but if it remains concealed in the womb, that body ſhould be cautiouſly opened, and the fœtus extracted.

In the ſecond caſe, the ſurgeon muſt make a longitudinal inciſion on the outſide of the rectus muſcle, between the naval and the angle of the os ilium, and thereby extract the fœtus. If the fœtus is contained in the fallopian tube, or in the ovary, thoſe parts are to be opened, and the fœtus, with its placenta, then removed: but if the fœtus is concealed in the uterus, this is alſo to be opened, by a longitudinal inciſion, ſufficient to give a paſſage to the fœtus, and its appendages.

In the third and laſt caſe, when the birth is prevented by a calloſity of the vagina, or ſomething amiſs in the mouth of the uterus, a diviſion and dilatation of theſe parts is preferable to the cæſarian ſection, as leſs dangerous; and the ſame may be ſaid when the vagina is obſtructed by the hymen, or ſome other preternatural membrane: but when the calloſity of the vagina is ſo large and hard, as to render the birth that way impracticable, if it was to be divided, there is no other means left but the cæſarian ſection. If a rupture of the uterus ſhould be made in the agonies of labour, ſo as to let out the fœtus into the cavity of the abdomen, in this caſe it will be neceſſary to make an inciſion in that part made moſt prominent by the fœtus, which ſhould be extracted, as before.

CÆSTUS, in antiquity, a large gantlet made of raw hide, which the wreſtlers made uſe of when they fought at the public games.

This was a kind of leathern ſtrap, ſtrengthened with lead, or plates of iron, which encompaſſed the hand, the wriſt, and a part of the arm, as well to defend theſe parts as to enforce their blows.

Cæstus, or Cæstum, was alſo a kind of girdle made of wool, which the huſband untied for his ſpouſe the firſt day of marriage, before they went to bed.

This relates to Venus's girdle, which Juno borrowed of her, to entice Jupiter to love her. See the article Cestus.

CÆSURA, in the ancient poetry is when, in the ſcanning of a verſe, a word is divided ſo as one part ſeems cut off, and goes to a different foot from the reſt; as

Menti | ri no | li, mun | quam men | dacia | proſunt.

Where the ſyllables *ri*, *li*, *quam*, and *mun*, are cæſuras.

Cæsura more properly denotes a certain and agreeable diviſion of the words between the feet of a verſe, whereby the laſt ſyllable of a word becomes the firſt of a foot; as in

Arma virumque cano, trojæ qui primus ab oris.

Where the ſyllables *no* and *jæ* are cæſuras.

Cæsure, in the modern poetry, denotes a reſt, or pauſe, towards the middle of an Alexandrine verſe, by which the voice and pronunciation are aided, and the verſe, as it were, divided into two hemiſtichs.

In Alexandrine verſe of twelve or thirteen ſyllables, the cæſure muſt always be on the ſixth; in thoſe of ten, on the fourth; and in thoſe of twelve, on the ſixth: verſes of eight ſyllables, muſt not have any cæſure.

CÆTERIS PARIBUS, a Latin term, often uſed by mathematical and phyſical writers; the words literally ſignifying the reſt, or the other things, being alike, or equal. Thus we ſay, the heavier the bullet, *cæteris paribus*, the greater the range; that is, by how much the bullet is heavier, if the length and diameter of the piece, and the quantity and ſtrength of the powder be the ſame, by ſo much will the utmoſt range or diſtance of a piece of ordnance be greater.

Thus alſo, in a phyſical way, we ſay, the velocity and quantity of the blood circulating, in a given time, thro' any ſection of an artery, will, *cæteris paribus*, be according to its diameter, and neareſt to, or diſtant from, the heart.

CAFFA, in commerce, painted cotton cloths manufactured in the Eaſt-Indies, and ſold at Bengal.

CAG, or KEG, of ſturgeon, &c. a barrel or veſſel that contains from four to five gallons.

CAHYS, a dry meaſure for corn, uſed in ſome parts of Spain, particularly at Seville and at Cadiz. It is near a buſhel of our meaſure.

CAIMACAN, or CAIMACAM, in the Turkiſh affairs, a dignity in the Ottoman empire, anſwering to lieutenant, or rather deputy, among us.

There are uſually two caimacans, one reſiding at Conſtantinople, as governor thereof; the other attending the grand vizir, in quality of his lieutenant, ſecretary of ſtate, and firſt miniſter of his council; and gives audience to ambaſſadors. Sometimes there is a third caimacan, who attends the ſultan; whom he acquaints with any public diſturbances, and receives his orders concerning them.

CAINIANS, or CAINITES, in church hiſtory, Chriſtian heretics, that ſprung up about the year 130, and took their name from Cain, whom they looked upon as their head and father: they ſaid that he was formed by a celeſtial and Almighty power, and that Abel was made but by a weak one.

This ſect adopted all that was impure in the hereſy of the Gnoſtics, and other heretics of thoſe times: they acknowledged a power ſuperior to that of the Creator; the former they called wiſdom; the latter, inferior virtue: they had a particular veneration for Korah, Abiram, Eſau, Lot, the Sodomites, and eſpecially Judas, becauſe his treachery occaſioned the death of Jeſus Chriſt: they even made uſe of a goſpel, which bore that falſe apoſtle's name.

CAISSON, in the military art, a wooden cheſt, into which ſeveral bombs are put, and ſometimes only filled with gunpowder: this is buried under ſome work, whereof the enemy intends to poſſeſs themſelves; and when they are maſters of it, is fired, in order to blow them up.

CAISSON is alſo uſed for a wooden frame, or cheſt, uſed in laying the foundations of the piers of a bridge.

CALABA, Indian maſtich-tree, in botany, a genus of trees, whoſe characters are: it has a roſaceous flower, conſiſting of ſeveral petals, which are placed in a circular order; from whoſe flower-cup ariſes the pointal, which afterwards becomes a ſpherical fleſhy fruit, including a nut of the ſame form.

This tree grows to a great magnitude in the warm parts of America, where it is a native. From the trunk and branches there iſſues out a clear gum, ſomewhat like the maſtich, from whence it received its name; the gum being uſed in thoſe countries as maſtich.

At preſent, this tree is pretty rare in England, it being ſo tender as not to bear the open air; ſo that it muſt be preſerved in ſtoves, with the moſt tender exotic plants. It is propagated by the nuts, which are frequently brought from America; theſe ſhould be planted in ſmall pots, filled with freſh light earth, and plunged into an hot bed of tanners bark, obſerving to water the pots frequently, to forward the vegetation of the nuts, which, having hard ſhells, are pretty long before they break their covers, unleſs they have a good ſhare of heat and moiſture. When the plants are come up about two inches high, they ſhould be carefully tranſplanted, each into a ſeparate ſmall pot, filled with freſh light earth, and plunged into a moderate hot-bed of tanners bark, obſerving to water and ſhade them until they have taken new root; after which time they ſhould have air admitted to them, in proportion to the heat of the weather, and the bed in which they are placed; and they muſt be frequently watered in warm weather. In this bed they may remain during the ſummer-ſeaſon; but at Michaelmas they ſhould be removed into the bark-ſtove, and placed in a warm ſituation. During the winter-ſeaſon theſe plants will require water pretty often; but it ſhould not be given to them in large quantities, eſpecially in cold weather, leſt it rot the fibres of their roots. As the plants advance, they muſt be ſhifted into larger pots, and treated in the ſame manner as the coffee-tree. See the article COFFEE *Tree.*

With this management the plant will thrive very well; and as the leaves of this plant are long, ſtrong, and of a ſhining green colour, they make a pretty appearance in the ſtove, with other tender exotic plants. *Miller's Gard. Dict.*

CALABASH, in botany, a ſpecies of melopepo, or cucurbita. See CUCURBITA.

CALABASH-*Tree*, the ſame with the creſcentia of Linnæus.

CALADE, in the menage, the deſcent or ſloping declivity of a riſing menage ground, being a ſmall eminence upon which we ride down a horſe ſeveral times, putting him to a ſhort gallop, with his fore hams in the air, to make him learn to ply or bend his haunches, and form his ſtop upon the aids of the calves of the legs, the ſtay of the bridle, and the caveſon, ſeaſonably given.

CALAMBA, or CALAMBAC-WOOD, the beſt kind of lignum-aloes.

CALAMANCO, a ſort of woollen ſtuff manufactured in England and in Brabant. It has a fine gloſs, and is chequered in the warp, whence the checks appear only on the right ſide. Some calamancos are quite plain, others have broad ſtripes adorned with flowers; ſome with plain broad ſtripes, ſome with narrow ſtripes, and others watered.

CALAMIFEROUS, among botaniſts, the ſame with culmiferous. See the article CULMIFEROUS.

CALAMINARIS, or LAPIS CALAMINARIS, in natural hiſtory, a mineral ſubſtance, of a greyiſh, browniſh, yellowiſh, or pale reddiſh colour, and ſometimes of all theſe colours variouſly mixed; conſiderably heavy, and moderately hard, but never ſufficiently ſo as to ſtrike fire with ſteel; when mixed with powdered charcoal, changing copper, by fuſion, into a yellow metal called braſs. It is found plentifully in England, Germany, and other countries, either in diſtinct mines, or intermingled with the ores of lead or other metals.

The matter which copper imbibes from this mineral in its converſion into braſs, ſeparates again from the braſs on keeping it melted in an open veſſel, and exhales in fumes, which condenſe, upon ſuch adjacent bodies as are leſs hot, into white flowers, the ſame with thoſe into which zinc is converted by fire. A mixture of calamine and powdered charcoal yields by itſelf, in open veſſels, or if the air is admitted, the ſame flowers: in cloſe veſſels, the zinc is revived, and either runs off, or ſublimes, in its proper metallic form, into that part of the veſſel which is moſt remote from the action of the fire. The quantity of zinc is variable, as of other metals in their ores. Marggraf informs us, in the Berlin Memoirs, that ſome of the foreign calamines yielded two ſixteenths of their weight, an Engliſh calamine three ſixteenths; and another Engliſh ſpecimen, from Holywell in Flintſhire, ſeven ſixteenths: from ſeveral parcels of the common calamine of the ſhops, nine ſixteenths have been gained. The moſt exact way of determining the quantity of zinc appears to be, by mixture with a pretty large proportion of copper, by which the zinc, reſolved into fume, is imbibed and detained.

This ore of zinc, employed principally for the making of braſs, is for that purpoſe roaſted or calcined; partly with a view to diſſipate ſome ſulphureous matter, which the crude mineral is ſuppoſed to contain; but chiefly to render it friable, and more eaſily reducible iuto fine powder. It is with the ore thus calcined, that the ſhops are generally ſupplied: where this cannot be procured, the mineral is heated to a ſtrong red heat, then quenched in water, and this proceſs repeated thrice. The roaſted calamine is levigated into an impalpable powder, which may be freed from the groſſer particles by waſhing it over with water.

In this ſtate it proves, for external purpoſes, an excellent reſtringent, deſiccative, and epulotic; of great uſe in collyria, againſt defluxions of thin acrid humours upon the eyes; and in unguents and cerates, for cutaneous ulcerations and excoriations. The officinal epulotic cerate, commonly called Turner's, is made by melting ſix ounces of yellow wax in a pint of oil olive, over a gentle fire, ſprinkling in ſix ounces of levigated calamine as ſoon as the mixture begins to grow ſtiff, and keeping the whole ſtirring till grown quite cold. The college of Edinburgh diminiſhes the proportion of the calamine, uſing only five ounces and a quarter to a pint of oil, with nine ounces of wax.

CALAMINT, *Calamintha*, in botany, a diſtinct genus of plants, with ſquare ſtalks; the leaves ſet in pairs; and the flowers on branched pedicles, whereof two iſſue from one joint in the boſoms of the leaves: the upper lip of the flower is divided into two ſegments, the lower lip into three. It is perennial, and flowers in June and July. There are three ſpecies of this plant uſed in medicine; namely,

1. Calamint, with reclining ſtalks; ſmall irregularly oval leaves, very ſlightly indented, without pedicles; and the flower ſtalks longer than the leaves. This ſpecies grows wild in dry grounds, and by the ſides of fields.

It has a ſtrong aromatic ſmell, approaching to that of penny-royal; and a moderately pungent taſte, ſomewhat like that of ſpearmint, but warmer. In virtue, it appears to be nearly ſimilar to a mixture of thoſe herbs: infuſions of the leaves are drank as tea, in weakneſſes of the ſtomach, flatulent cholics, and uterine obſtructions.

Water extracts by infuſion nearly all the virtues of the calamint, and carries off, in evaporation, the whole of its ſpecific flavour. In diſtillation with water, there ſeparates from the aqueous fluid a conſiderable quantity of eſſential oil, of a very pungent taſte, and ſmelling ſtrongly of the herb. The remaining decoction, thus diveſted of the aromatic part of the plant, is unpleaſantly roughiſh, bitteriſh, and mucilaginous.

Rectified ſpirit extracts the virtues of the calamint more perfectly than water, and gains from it a deep green tincture. On gently diſtilling the filtered liquor, a part of the flavour of the herb riſes with the ſpirit, and a part remains behind in the inſpiſſated extract. Spirit manifeſtly brings over more from this plant than from ſpearmint, and leſs than from penny-royal; its active matter being more volatile than that of the one, and leſs ſo than that of the other.

2. Common calamint, with upright ſtalks; larger, ſhort, ſerrated, pointed leaves, ſet on pedicles; and the flower-ſtalks of the length of the leaves. It is found wild about the ſides of highways, but is leſs common in this country than the other.

The leaves of this ſpecies are in taſte weaker than thoſe of the preceding. Their ſmell is ſtrong, not like that of penny-royal, but rather approaching to that of the wild mints, though more agreeable. The eſſential olis of the two plants differ in flavour as the herbs themſelves: in the ſpirituous extracts the difference is leſs conſiderable. They are ſuppoſed to agree in virtue, and have been uſed indiſcriminately; the ſhops being generally ſupplied with the ſpecies which is moſt eaſily procurable.

3. Mountain calamint, with larger leaves and flowers than the two preceding, but ſmaller ſtalks; the leaves ſet on pedicles, pointed, acutely and deeply ſerrated like thoſe of nettles; the flower-ſtalks ſhorter than the leaves, and of the length of the flowers themſelves. It is a native of the ſouthern parts of Europe, and raiſed with us in gardens.

This ſpecies has a moderately pungent taſte, and a more agreeable aromatic ſmell than either of the other calamints. It appears to be the moſt eligible of the three as a ſtomachic.

CALAMUS Aromaticus, or Acorus Verus, in the materia medica, is the root of a kind of flag growing in marſhy places in ſome parts of Europe: it is pretty long, full of joints, of a whitiſh, reddiſh, and partly of a greeniſh colour on the outſide, white and ſpongy within, eaſy to break, of a ſtrong aromatic ſmell, and a warm pungent taſte. In firm grounds, it ſpreads into many ſlender ſtrings, which in mere watery ones it does not.

The diſtinguiſhing taſte and grateful flavour of this root reſide wholly in the eſſential oil, the decoction remaining after the diſtillation of the oil having a nauſeous taſte, not at all like that of the calamus: from ſixteen ounces of the dry root, little more than two ſcruples of oil are obtained: from the freſh roots we can ſcarcely collect any, the oil remaining all diſſolved in the diſtilled water. Hermann reports, that the oil and water of calamus aromaticus are highly ungrateful; but they are quite the reverſe: nor do the old decayed roots, which Wedel ſuſpects Hermann's oil and water to have been drawn from, give any thing diſagreeable in diſtillation.

Highly rectified ſpirit elevates little or nothing of this oil: hence a ſpirituous extract made from the root ſmells conſiderably, and taſtes ſtrongly, of the calamus. Two ounces yielded with ſpirit ſix drams and half a ſcruple; and afterwards with water three drams ten grains of extract; water applied at firſt extracted, from the ſame quantity, ſeven drams thirty-five grains; and ſpirit afterwards forty-three grains. *Neumann's Chemiſtry.*

Calamus-Scriptorius, in antiquity, a reed or ruſh to write with.

The ancients made uſe of ſtyles to write on tables covered with wax; and of reed, or ruſh, to write on parchment, or Egyptian paper.

Calamus-Scriptorius, in anatomy, a dilatation of the fourth ventricle of the brain; ſo called from its figure, which reſembles that of a gooſe-quill.

CALANDRA, in ornithology, a name by which ſome call the great lark, without any creſt.

CALASH, or Calesh, a light and very low kind of chariot, uſed chiefly for taking the air in parks and gardens.

Knights of CALATRAVA, a military order in Spain, inſtituted under Sancho III. king of Caſtile, upon the following occaſion. When that prince took the ſtrong fort of Calatrava from the Moors of Andaluſia, he gave it to the Templars, who, wanting courage to defend it, returned it him again. Then Don Reymond, of the order of the Ciſtercians, accompanied with ſeveral perſons of quality, made an offer to defend the place, which the king thereupon delivered up to them, and inſtituted that order. It increaſed ſo much under the reign of Alphonſus, that the knights deſired they might have a grand maſter, which was granted. Ferdinand and Iſabella afterwards, with the conſent of pope Innocent VIII. reunited the grand maſterſhip of Calatrava to the Spaniſh crown; ſo that the kings of Spain are now become perpetual adminiſtrators thereof.

The knights of Calatrava bear a croſs gules, fleurdeliſed with green, &c. their rule and habit was originally that of the Ciſtercians.

CALCANEUM, or Os Calcis, in anatomy, the bone lying under the aſtragalus, to which, and the os cuboides, it is articulated. Its apophyſis behind ſerves to prevent our falling backward, and on its poſterior ſurface is inſerted the tendo achillis; in its interior ſide there is an excavation, intended to give ſafe paſſage to the veſſels running to the metatarſus and toes.

CALCAR, in anatomy, the ſame with calcaneum. See the article Calcaneum.

Calcar, in glaſs-making, a ſort of oven, or reverberatory furnace, in which being well heated, the cryſtal frit, or bollito, is made.

CALCARIOUS, in general, denotes ſomething belonging to, or partaking of, the nature of calx. See the article Calx.

Calcarius Lapis, in natural hiſtory, the ſame with lime ſtone. See Lime.

CALCEDON, among jewellers, denotes a flaw or foul vein, like chalcedony, found in ſome precious ſtones.

CALCEDONY, or Chalcedony, in the hiſtory of precious ſtones. See the article Chalcedony.

CALCINATION, in chemiſtry, the ſeparating, by means of heat, or fire, the more fixed from the volatile parts of any compound body.

Calcination has, by ſome, been very improperly called chemical pulverization, as if the whole intention conſiſted in reducing bodies to powder by means of heat: but this is a great miſtake; for though the deſtruction or diminution of the tenacity is often the conſequence, and ſometimes, perhaps, the intentional end of calcination; yet it is in many caſes otherwiſe, ſince lapis calaminaris and other bodies, after they have ſuffered what is every where called calcination, are yet very far from the condition of the powder; and if the making bodies fit, by means of fire, to undergo pulverization, alone conſtituted calcination; then that kind of exſiccation which is employed on rhubarb, and called torrifying, would of courſe come within the meaning of the term, contrary to the univerſal uſe of the word.

There are others that, not even making the aſſiſtance of fire neceſſary, call all the methods, by which bodies are reduced to the ſtate of powders, calcination. But ſuch diffuſive extenſions of the ſenſe of terms, where they are made to comprehend a multiplicity of things not allied by any juſt analogy, are highly prejudicial, obſtructing thoſe clear and communicable notions which diſtinct and properly limited terms afford, and introducing that perplexity and confuſion which generally ſo much abounds in medical writers.

There are ſeveral ſpecies of calcination which differ in regard to the effect with which the fire is ſuffered to operate on the calcined matter. As ſometimes the whole of the volatile heat; while at others, by a gentler degree or prolongation of it, which would alſo follow, they are retained. Thus, in the calcination of tin, all the ſulphureous, which is the only volatile part of it, is drove off; and an earthy calx, no longer changeable by any degree of duration of the heat, is left behind. But in the calcination of lapis calaminaris, the crude ſulphur and arſenic alone are diſſipated; while the zinc, which with a greater degree of fire would be all likewiſe drove off, is left with the earthy part. Calcination may therefore be divided into perfect, or where the utmoſt change, except vitrification, which can be effected by heat, is brought about; and imperfect, where the degree of heat is limited, and only a part of the alteration it is capable of producing is ſuffered.

CALCULATION, the act of computing ſeveral ſums, by adding, ſubtracting, multiplying, or dividing. See the articles ARITHMETIC, ADDITION, &c.

CALCULATION is more particularly uſed to ſignify the computations in aſtronomy and geometry, for making tables of logarithms, ephemerides, finding the time of eclipſes, &c.

CALCULATION *of Clock and Watch Work.* See CLOCK and WATCH-WORK.

CALCULUS, in natural hiſtory, properly denotes a little ſtone or pebble. See the article PEBBLE.

CALCULUS, or CALCULUS-HUMANUS, in medicine, the ſtone in the bladder or kidneys. See the article STONE.

CALCULUS *Differentialis.* See DIFFERENTIAL *Calculus.*

CALCULUS *Integralis.* See INTEGRAL *Calculus.*

CALEFACTION, the production of heat in a body from the action of fire, or that impulſe impreſſed by a hot body upon other bodies about it. This word is uſed in pharmacy, by way of diſtinction from coction, which implies boiling; whereas calefaction is only heating a thing.

CALENDAR, *Calendarium*, a diſtribution of time, accommodated to the various uſes of life, but more eſpecially ſuch as regard civil and eccleſiaſtical polity; in which ſenſe it differs nothing from the modern almanacs. See the article ALMANAC.

The firſt calendar was made by Romulus, who divided the year into ten months only, beginning on the firſt day of March, and containing three hundred and four days, in which time he imagined the ſun performed his courſe through all the ſeaſons.

This calendar was reformed by Numa Pompilius, who added two months more, viz. January and February, placing them before March. His year began on the firſt of January, and conſiſted of three hundred and ſixty-five days. This was afterwards improved by Julius Cæſar, and was by him called the Julian account, which reduced the year to three hundred and ſixty-five days, ſix hours; and was retained in moſt proteſtant countries, and in our nation till the year 1752. This year is diſpoſed into quadriennial periods, whereof the three firſt years, which were called common, conſiſted of three hundred and ſixty-five days, and the fourth biſſextile, of three hundred and ſixty-ſix. See the article BISSEXTILE.

The Julian account was afterwards corrected by pope Gregory XIII. which on that account obtained the name of the Gregorian calendar, or new-ſtyle, the Julian being called the old-ſtyle: and though the Gregorian calendar be preferable to the Julian, yet it is not without its defects: perhaps, as Tycho Brahe and Caſſini imagine, it is impoſſible ever to bring the year to a perfect juſtneſs.

Julian Chriſtian CALENDAR, that wherein the days of the week are determined by the letters A,B,C,D,E,F,G; by means of the ſolar cycle, and the new and full moons, eſpecially the Paſchal full moon, with the feaſt of Eaſter, and the other moveable feaſts depending thereon, by means of golden numbers rightly diſpoſed through the Julian year. See the article GOLDEN NUMBER.

Gregorian CALENDAR, that which, by means of epacts rightly diſpoſed through the ſeveral months, determines the new and full moons, and the time of Eaſter, with the moveable feaſts depending thereon, in the Gregorian year. See EPACT.

Reformed, or corrected CALENDAR, that which, ſetting aſide golden numbers, epacts, and dominical letters, determines the equinox, with the Paſchal full moon, and the moveable feaſts depending thereon, by aſtronomical computations, according to the Rudolphine tables. This calendar was introduced among the proteſtant ſtates of Germany in the year 1700, when eleven days were, at once, thrown out of the month of February, by which means the corrected ſtyle agrees with the Gregorian.

CALENDER, a machine uſed in manufactories, to preſs certain woollen and ſilken ſtuffs, and linens, to make them ſmooth, even, and gloſſy, or to give them waves, or water them, as may be ſeen in mohairs and tabbies. This inſtrument is compoſed of two thick cylinders, or rollers, of very hard and poliſhed wood, round which the ſtuffs, to be calendered, are wound: theſe rollers are placed croſswiſe, between two very thick boards, the lower ſerving as a fixed baſe, and the upper moveable, by means of a thick ſcrew, with a rope faſtened to a ſpindle, which makes its axis: the uppermoſt board is loaded with large ſtones cemented together, weighing twenty thouſand pounds, or more. It is this weight that gives the poliſh, and makes the waves on the ſtuffs about the roller, by means of a ſhallow indenture or engraving cut in it.

CALENDS, *Calendæ*, in Roman antiquity, the firſt day of each month, ſo called from the Greek καλειν, to proclaim; it being cuſtomary on thoſe days to proclaim the number of holy-days in each month.

The Roman method of reckoning the days of their months has ſomething extremely ſingular in it: inſtead of computing forwards, in the natural order of the numbers 1, 2, 3, &c. they reckoned backwards, in the manner expreſſed in the following verſes:

> *Prima dies menſis cujuſque eſt dicta calendæ:*
> *Sex Maius, nonas, Julius, October, & Mars;*
> *Quatuor at reliqui: habet idus quilibet octo;*
> *Inde dies reliquos omnes dic eſſe calendas;*
> *Quas retro numerans, dices a menſe ſequente.*

Hence to find the day of our month, anſwering to that of the calends, to the number of days in the preceding month add two, and from this ſum ſubtracting the number of calends given, the remainder will be the day of our month: thus the fourth of the calends of June is found to anſwer to the twenty-ninth of May; and ſo in other caſes.

CALENDULA, mary-gold, in botany, a genus of plants, with oblong undivided leaves, joined cloſe to the ſtalk, widening from thence to the extremity, juicy, and ſomewhat clammy to the touch; and moderately large, bright yellow or gold coloured flowers, compoſed of a number of indented petals ſtanding round a middle diſk, on which, after the flower has fallen, ſeveral rough crooked ſeeds lie naked. It is annual, common in gardens, propagates itſelf by ſeeds, and flowers from May to the end of autumn.

Marigold flowers have been recommended as aperients in uterine obſtructions and icteric diſorders; as ſudorifics, alexipharmics, and for promoting eruption in malignant and exanthematous fevers. They appear, from their ſenſible qualities, to be of little activity: when freſh they have a faint unpleaſant ſmell, which is loſt in drying: their taſte is chiefly mucilaginous, with a ſlight bitteriſhneſs. They give a pale yellow tincture to water, and a deeper yellow to ſpirit: the watery infuſion has the moſt ſmell, and the ſpirituous the moſt taſte of the flowers. The extract, obtained by inſpiſſating the ſpirituous tincture, is bitteriſh and ſlightly roughiſh: the watery extract is a tenacious mucilage, of leſs taſte than the other.

The leaves of the plant appear to be of greater virtue than the flowers. Chewed, they impreſs at firſt a viſcid ſweetneſs, which is followed by a penetrating pungency, very durable in the mouth, not of the hot or aromatic, but rather of the ſubſaline kind. Their expreſſed juice, which contains great part of the pungent matter of the herb, has been given in doſes of two or three ounces or more, as an aperient; and is ſaid to looſen the belly, and promote the natural ſecretions in general. See Mary-Gold.

CALENTURE, *Calentura*, in medicine, a feveriſh diſorder incident to ſailors in hot climates; the principal ſymptom of which is, their imagining the ſea to be green fields: hence, attempting to walk abroad in theſe imaginary places of delight, they are frequently loſt.

Vomiting, bleeding, a ſpare diet, and the neutral ſalts are recommended in this diſorder; a ſingle vomit commonly removing the delirium, and the cooling medicines completing the cure.

CALF, *Vitulus*, in zoology, the young of the ox kind.

Among ſportſmen, the term calf is uſed for a hart or hind of the firſt year. The ſame term is alſo uſed for the young of the whale.

There are two ways of breeding calves; one, when they are allowed to ſuck their dams all the year round, chiefly uſed in countries where paſture is cheap; and the other, when being taken from their dams after ſucking a fortnight, they are taught to drink milk, or milk and water, out of a tub. The former, however, of theſe methods is allowed to make the beſt cattle.

CALIBER, or **Caliper**, properly denotes the diameter of any body: thus we ſay, two columns of the ſame caliber, the caliber of the bore of a gun, the caliber of a bullet, &c. See Cannon, &c.

Caliber-Compasses, the name of an inſtrument, made either of wood, iron, ſteel, or braſs: that uſed for meaſuring bullets conſiſts of two branches, bending inwards, with a tongue fixed to one of them, and the other graduated in ſuch a manner, that if the bullet be compreſſed by the ends of the two branches, and the tongue be applied to the graduated branch, it will ſhew the weight of the bullet.

Caliber alſo ſignifies an inſtrument uſed by carpenters, joiners, and bricklayers, to ſee whether their work be well ſquared.

CALIDUCT, in antiquity, a kind of pipes, or canals, diſpoſed along the walls of houſes and apartments, uſed, by the ancients, for conveying heat to ſeveral remote parts of the houſe, from one common furnace.

CALIPH, the ſupreme eccleſiaſtical dignity among the Saracens; or, as it is otherwiſe defined, a ſovereign dignity among the Mahometans, veſted with abſolute authority in all matters relating both to religion and policy.

It ſignifies in the Arabic ſucceſſor, or vicar: the Saracen princes aſſumed this title as deſcendants from Mahomet; the caliphs bearing the ſame relation to Mahomet, that the popes pretend they do to Jeſus Chriſt, or St. Peter. It is at this day one of the grand ſeignor's titles, as ſucceſſor of Mahomet; and of the ſophi of Perſia, as ſucceſſor of Ali.

CALIPPIC PERIOD, an improvement of the cycle of Meton, of nineteen years, which Calippus, a famous Grecian aſtronomer, finding in reality to contain nineteen of Nabonaſſar's years, four days, and $\frac{11}{16}$, he, to avoid fractions, quadrupled the golden number, and by that means made a new cycle of ſeventy ſix years; which time being expired, he ſuppoſed the lunation, or changes of the moon, would happen on the ſame day of the month, and hour of the day, that they were on ſeventy-ſix years before.

CALIXTINS, in church hiſtory, a ſect of Chriſtians in Bohemia and Moravia: the principal point in which they differed from the church, was the uſe of the chalice, or communicating in both kinds.

Calixtins is alſo a name given to thoſe, among the Lutherans, who follow the ſentiments of George Calixtus, a celebrated divine, who oppoſed the opinion of St. Auguſtine, on predeſtination, grace, and free-will.

CALKINS, the prominent parts at the extremities of a horſe-ſhoe, bent downwards, and forged to a ſort of point.

Calkins are apt to make horſes trip; they alſo occaſion blymes, and ruin the back ſinews. If faſhioned in form of a hare's ear, and the horn of a horſe's heel be pared a little low, they do little damage; whereas the great ſquare calkins quite ſpoil the foot.

Calkins are either ſingle or double; that is, at one end of the ſhoe, or at both: theſe laſt are deemed leſs hurtful, as the horſe can tread more even.

CALICO, or **Callico**, a kind of linen manufacture, made of cotton, chiefly in the Eaſt Indies. There is a great trade in the province of Bengal, in this commodity, which is tranſported in prodigious quantities into Perſia, Turkey, Arabia, Muſcovy, and all over Europe. Some of them are painted with flowers of various colours; and the women in the Indies make veils and ſcarfs of them, and, of ſome, coverlets for beds, and handkerchiefs. They make another ſort of this manufacture, which they never dye, and hath a ſtripe of gold and ſilver quite through the piece; and at each end, from the breadth of one inch to twelve or fifteen, they fix a tiſſue of gold, ſilver, and ſilk, intermixed with flowers; both ſides are alike. They make alſo other ſorts of cotton cloths at Brampour, becauſe there is no other province in all the Indies which has greater quantities of cotton.

At Seconge they are ſaid to make the beſt ſorts of calicoes; in all other parts the colours are neither ſo lively nor laſting, but wear out with often waſhing; whereas thoſe made at Seconge grow the fairer the more you waſh them. This is ſaid to ariſe from a peculiar virtue of the river that runs by the city, when the rain falls; for the workmen, having made ſuch prints upon their cottons as the foreign merchants give them, by ſeveral patterns, dip them into the river often, and that ſo fixes the colours, that they will always hold. There is alſo made at Seconge a ſort of calico ſo fine, that when a perſon puts it on, his ſkin ſhall appear as plainly through it as if he was quite naked; but the merchants are not permitted to tranſport it; for the governor is obliged to ſend it all to the Great Mogul's ſeraglio, and the principal lords of the court, to make the ſultaneſſes and noblemen's wives ſhifts, and garments for hot weather.

The city of Baroche alſo is very famous for trade, on account of the river, which has a peculiar quality to whiten their calicoes, and which are, therefore, brought from all parts of the mogul's territories thither for that end.

This manufacture is brought into this nation by the Eaſt-India company, which is re-exported by private merchants to other parts of Europe and America.

Calico-*Printing*, the art of ſtaining calicoes, &c. of various colours. See Linen-*Printing*.

CALLIMUS, καλλιμ**ⴿ**, in natural hiſtory, the name uſed by the ancients for the looſe ſubſtance found within the ætites, or eagle-ſtone. See the article Ætites.

CALLING *the Houſe*, in the Britiſh parliament, is the calling over all the members names, every one anſwering to his own, and going out of the houſe, in the order in which he is called: this they do in order to diſcover whether there be any perſons there not returned by the clerk of the crown; or if any member be abſent without leave of the houſe.

CALLISTEA, in Grecian antiquity, a Leſbian feſtival, wherein the women preſented themſelves in Juno's temple, and the prize was aſſigned to the faireſt. There was another of theſe contentions at the feſtival of Ceres Eleuſinia, among the Parrhaſians, and another among the Eleans, where the moſt beautiful man was preſented with a complete ſuit of armour, which he conſecrated to Minerva, to whoſe temple he walked in proceſſion, being accompanied with his friends, who adorned him with ribbons, and crowned him with a garland of myrtle.

CALLOUS, *Calloſus*, ſomething partaking of the nature of a callus.

CALLOSUM CORPUS, in anatomy, a whitiſh hard ſubſtance, joining the two hemiſpheres of the brain, and appears in view when the two hemiſpheres are drawn back. See the article Brain.

In this part Lanciſi, and ſeveral others, have ſuppoſed the ſoul particularly to reſide.

CALLUS, or Callosity, in a general ſenſe, any cutaneous, corneous, or oſſeous hardneſs, whether natural or preternatural: but moſt frequently it means the callus generated about the edges of a fracture, provided by nature to preſerve the fractured bones, or divided parts, in the ſituation in which they are replaced by the ſurgeon.

A callus, in this laſt ſenſe, is a ſort of jelly, or liquid viſcous matter, that ſweats out from the ſmall arteries and bony fibres of the divided parts, and fills up the chinks, or cavities, between them. It firſt appears of a cartilaginous ſubſtance, but at length becomes quite bony, and joins the fractured part ſo firmly together, that the limb will often make greater reſiſtance to any external violence with this part, than with thoſe which were never broken.

But as the new fleſh in wounds will often ſprout up too faſt, ſo will the callus in fractures, and by this means render the limb uneven and deformed: the only meaſure to prevent this luxuriancy, is by making the bandage ſomewhat tighter than ordinary, and wetting it firſt with ſpirits of wine. When the callus is indurated, we have no medicine that will deſtroy it, or take it down: however, the emplaſtrum de ranis vigon. cum mercurio, tying a plate of lead over it, is preſcribed for taking it down.

Callus is alſo a hard, denſe, inſenſible knob, riſing on the hands, feet, &c. by much friction and preſſure againſt hard bodies.

CALOGERI, in church hiſtory, monks of the Greek church, divided into three degrees, the novices, called archari; the ordinary profeſſed, called microchemi; and the more perfect, called megalochemi: they are likewiſe divided into cænobites, anachorets, and recluſes. The cænobites are employed in reciting their office from midnight to ſun-ſet; they are obliged to make three genuflexions at the door of the choir; and returning, to bow to the right and to the left, to their brethren. The anachorets retire from the converſation of the world, and live in hermitages in the neighbourhood of the monaſteries; they cultivate a little ſpot of ground, and never go out but on Sundays and holidays, to perform their devotions at the next monaſtery. As for the recluſes, they ſhut themſelves up in grottos and caverns, on the tops of mountains, which they never go out of, abandoning themſelves entirely to providence: they live on the alms ſent them by the neighbouring monaſteries.

CALOMEL, in the materia medica, a name given to mercurius dulcis, ſublimated ſix times: the preparation is done thus.

Take corroſive ſublimate a pound, purified mercury nine ounces; add the quickſilver to the mercury, reduce to powder, and digeſt them together in a glaſs mattraſs, in a gentle ſand heat, frequently ſhaking the veſſel, till the whole is united: when they are thus mixed, increaſe the heat, ſo as to ſublimate the whole: take out the ſublimate, and ſcrape off an acrid part that is found at the top of it; and if any globules of mercury appear, ſeparate them alſo: let the ſublimation be repeated ſix times. It is a gentle purgative, and a very noble attenuant. It is the greateſt of all medicines againſt worms, and is now the general remedy in a gonorrhœa. The common method of giving it is in a bolus, over night, ten or twelve grains for a doſe, and a purging draught the next morning, &c. Rubbed with an equal quantity of ſulphur antimonii auratum, it is recommended as a powerful and ſafe alterative.

CALOTTE, a cap or coif of hair, ſatin, or other ſtuff; an eccleſiaſtical ornament in moſt popiſh countries.

Calotte, in architecture, a round cavity or depreſſure, in form of a cap or cup, lathed and plaiſtered, uſed to diminiſh the riſe or elevation of a moderate chapel, cabinet, alcove, &c. which, without ſuch an expedient, would be too high for other pieces of the apartment.

CALQUING, or Calking, a term uſed in painting, &c. where the backſide of any thing is covered with a black or red colour, and the ſtrokes or lines traced thro', on a waxed plate, wall, or other matter, by paſſing lightly over each ſtroke of the deſign with a point, which leaves an impreſſion of the colour on the plate or wall.

CALTHA, marſh-marygold, in botany, a genus of plants; the flower of which conſiſts of five large, oval, plane, patent, deciduous petals: the fruit is ſhort, acuminated, patent, bicarinated, and open at the upper ſuture; the ſeeds are numerous and roundiſh, and adhere to the upper ſuture.

CALTROP, in military affairs, an inſtrument with four iron points, diſpoſed in a triangular form, ſo that three of them are always on the ground, and the fourth in the air. They are ſcattered over the ground where the enemy's cavalry is to paſs, in order to embarraſs them.

Caltrop, in botany, the Engliſh name of the tribulus of botaniſts. See the article Tribulus.

CALVARIA, in anatomy, the hairy ſcalp or upper-part of the head, which, either by diſeaſe, or old age, grows bald firſt. See the articles Head and Calvities.

CALVARY, in heraldry, a croſs ſo called, becauſe it reſembles the croſs on which our Saviour ſuffered. It is always ſet upon ſteps.

CALVINISTS, in church hiſtory, thoſe who follow the opinions of John Calvin, one of the principal reformers of the church in the ſixteenth century; a perſon of great parts and induſtry, and of conſiderable learning; whoſe doctrine ſtill ſubſiſts in its greateſt purity at Geneva, where it was firſt broached, and from whence it was propagated. This is the prevailing religion of the United Provinces. In England it is confined among the diſſenters; and, in Scotland, it ſubſiſts in its utmoſt rigour.

The Calviniſts are great advocates for the abſoluteneſs of God's decrees; and hold that election and reprobation depend on the mere will of God, without any regard to the merit or demerit of mankind; that he affords to the elect an irreſiſtible grace, a faith that they cannot loſe, which takes away the freedom of will, and neceſſitates all their actions to virtue.

The Calviniſts believe that God fore-knew a determinate number, whom he pitched upon to be perſons, in whom he would manifeſt his glory; and that having thus fore-known them, he predeſtinated them to be holy, in order to which he gives them an irreſiſtible grace, which makes it impoſſible for them to be otherwiſe.

CALVITIES, or Calvitium, in medicine, baldneſs, or a want of hair, particularly on the ſinciput, occaſioned by the moiſture of the head, which ſhould feed it, being dried up, by ſome diſeaſe, old age, or the immoderate uſe of powder, &c. See the article Alopecia.

CALUMET, a ſymbol of peace among the Indians in the north of America. It is made of a red ſtone, like our marble; the head reſembles our tobacco-pipes, but larger; and is fixed on a hollow reed, to hold it for ſmoaking: they adorn it with fine wings of ſeveral colours, and is the calumet of the ſun, to whom they preſent it, eſpecially if they want fair weather, or rain. This pipe is a paſs and ſafe-conduct amongſt all the allies of the nation who has it given: in all embaſſes the ambaſſador carries it as an emblem of peace, and it always meets with a profound regard; for the ſavages are generally perſuaded, that a great misfortune would befal them, if they violated the public faith of the calumet.

CALX, properly ſignifies lime, but is alſo uſed by chemiſts and phyſicians for a fine powder remaining after the calcination, or corroſion of metals and other mineral ſubſtances. See Calcination and Lime.

CALYCISTÆ, an appellation given by Linnæus to thoſe botaniſts who have claſſed plants according to the different ſtructure of the calyx, or cup of the flowers; ſuch was Magnolius.

CALYPTRA, among botaniſts, a thin membranaceous involucrum, uſually of a conic figure, which covers the parts of fructification. The capſules of moſt of the moſſes have calyptræ.

CALYX, among botaniſts, a general term expreſſing the cup of a flower, or that part of a plant which ſurrounds and ſupports the other parts of the flower.

The cups of flowers are very various in their ſtructure, and on that account diſtinguiſhed by ſeveral names, as perianthium, involucrum, ſpatha, gluma, &c. See the articles PERIANTHIUM, &c.

CAMÆA, in natural hiſtory, a genus of the ſemipellucid gems, approaching to the onyx ſtructure, being compoſed of zones, and formed on a cryſtalline baſis; but having their zones very broad and thick, and laid alternately on one another, with no common matter between; uſually leſs tranſparent, and more debaſed with earth, than the onyxes.

One ſpecies of the camæa is the dull looking onyx, with broad black and white zones; and is the camæa of the moderns, and the Arabian onyx: this ſpecies is found in Egypt, Arabia, Perſia, and the Eaſt-Indies. Another ſpecies of the camæa is the dull, broad-zoned, green and white camæa, or the jaſpi-cameo of the Italians: it is found in the Eaſt-Indies, and in ſome parts of America. The third is the hard camæa, with broad white and cheſnut-coloured veins; and the fourth the hard camæa, with bluiſh, white, and fleſh-coloured broad veins, being the ſardonyx of Pliny's time, only brought from the Eaſt-Indies.

CAMAIEU, or CAMEHUIA, in natural hiſtory, the ſame with camæa. See the preceding article.

CAMAIEU is alſo a term in painting, when there is only one colour, the lights and ſhades being of gold, or on a golden and azure ground. It is chiefly uſed to repreſent baſſo-relievos.

CAMALDULIANS, a religious order founded by St. Romauld, in a little plain on the Mount Apennine, called Camaldali, ſituated in the ſtate of Florence.

The manner of life firſt enjoined this order, was, that they dwelt in ſeparate cells, and met together only at the time of prayer: ſome of them, during the two lents of the year, obſerved an inviolable ſilence; and others, for the ſpace of an hundred days. On Sundays and Thurſdays they fed on herbs, and the reſt of the week only on bread and water. Theſe conſtitutions were, however, a little moderated ſometime afterwards. This hermitage is now accounted very rich.

CAMBERED-DECK, is a deck that lies irregular, being higher in one place than another, and conſequently very unfit for a ſhip of war.

CAMBLET, or CAMLET, a plain ſtuff, compoſed of a warp and woof, which is manufactured on a loom, with two treddles, as linens are.

There are camblets of ſeveral ſorts, ſome of goats hair, both in the warp and woof; others, in which the warp is of hair, and the woof half hair and half ſilk; others again, in which both the warp and the woof are of wool; and laſtly, ſome, of which the warp is of wool and the woof of thread. Some are dyed in the thread, others are dyed in the piece, others are marked or mixed; ſome are ſtriped, ſome waved or watered, and ſome figured.

Camblets are proper for ſeveral uſes, according to their different kinds and qualities: ſome ſerve to make garments both for men and women; ſome for bed curtains; others for houſhold furniture, &c.

CAMEL, *Camelus*, in zoology, a genus of quadrupeds, of the order of the pecora; diſtinguiſhed from the reſt by having no horns.

This genus comprehends the camel, properly ſo called, with two bunches on its back; the dromedary, or camel with a ſingle bunch; the glama, or Peruvian camel, with a gibboſe breaſt and even back; and the pacos, or camel with no gibboſity at all.

The camel is larger than the dromedary, and covered with a fine fur, ſhorter as well as ſofter than that of the ox kind: only about the branches there grow hairs nearly a foot long. It is a native of Aſia, particularly of Bactria, and makes an excellent beaſt of burden.

CAMELEON, or CHAMÆLEON, in zoology. See the article CHAMÆLEON.

CAMELLIA, in botany, a genus of plants; the flower conſiſts of five ovated petals, connected vertically at the baſe; the fruit is a turbinated, lignoſe, and furrowed capſule; the ſeeds are numerous and ſmall.

CAMELOPARDALIS, in zoology, a creature of the deer kind, otherwiſe called zurnapa. See the article ZURNAPA.

CAMERA OBSCURA, in optics, a machine for exhibiting the picture of a landſcape, &c. in its natural colours.

The camera obſcura, or darkened chamber, is made after two different methods; one is the camera obſcura, or darkened chamber at large; that is, any large room or chamber made as dark as poſſible, ſo as to exclude the light in every part except a ſmall circular hole in the window ſhutter, where a lens fixed in a ball is placed. The other camera obſcura is ſmall; and thence often called a portable camera obſcura, from its being carried from place to place, for taking a perſpective view of any propoſed place or part of the country.

Plate XXXI. exhibits both ſorts of theſe darkened chambers.

The upper compartment of the plate repreſents a terrace, on which are placed two portable machines of this kind.

Fig. 1. is a portable camera obſcura, in the form of a ſedan chair, having a door behind. A, a ſmall ſquare turret, in which a mirrour is placed. B, the mirrour, either of glaſs or metal. C, the tube in which the lens is faſtened. D, the table on which the deſigner lays his paper to receive the images of the objects. E, the deſigner's ſeat. F, F, ledges of wood for ſtrengthening and darkening the machine. G, G, G, other ledges faſtened to the door, in order to exclude the light when the door is ſhut.

Fig. 2. another camera obſcura, more portable than the former, in the form of a pavilion; it is placed upon a table, which is no part of the machine. It has the ſame uſe, and the apparatus on the top is the ſame as in the other.

Fig. 3. a lateral ſection of the firſt camera obſcura, on a larger ſcale. The parts are the ſame as *fig.* 1. and are marked with the ſame letters of reference. To which muſt be added, that H K is an iron rod, faſtened to the frame of the mirrour B, by a turning joint, and to the front of the camera by a female ſcrew at K. C is the tube containing the lens; between this and the upper tube is a male ſcrew, by which both are faſtened. L M, part of one of the poles by which the machine is carried.

Fig. 4. a board of wood covered with white paper.

Fig 5. a frame for keeping the ſheet of paper firm and ſteady on the board.

Fig. 6. repreſents the large camera obſcura, where A B C D is the proſpect of a houſe, trees, &c. E F, a darkened room, or camera obſcura; on one ſide is the picture G H, of the above view, inverted, formed by a convex lens in a ball fixed before a hole in the oppoſite ſide I K at V.

Having deſcribed the two ſorts of darkened chambers, it will be neceſſary to enumerate ſome particulars which muſt be attended to in this philoſophical contrivance.

Firſt, That the lens be extremely good, or free from any veins, blebs, &c. which may diſtort or blemiſh the picture.

Secondly, That the lens be placed directly againſt the object whoſe picture you would have perfectly formed to contemplate; for if the glaſs has any other poſition to the object, the image will be very imperfect, indiſtinct, and confuſed.

Thirdly, Care ought to be taken that the ball be ſufficiently large, and the frame in which it is placed not too thick, that ſo there be ſufficient room for turning the ball every way to take in as many objects as poſſible, and to render the uſe thereof more compleat.

Fourthly, The lens ought to be of a juſt magnitude or aperture; for if it be too ſmall, the image will be obſcure, and the minute parts not viſible at a diſtance for want of requiſite light. On the other hand, if the aperture be too large, the image will be confuſed, and become indiſtinct by too much light.

Therefore, fifthly, if by experience we find that an aperture of two inches diameter is beſt for a lens of ſix feet focal diſtance, then the diameter of any other lens of a different focal diſtance, ought to be in the ſubduplicate ratio of ſix to the ſaid focal diſtance, that the object, or its image rather, may be equally bright and diſtinct in both.

Sixthly, We ought not to attempt to exhibit a picture of objects in a dark room, unleſs the ſun ſhines upon, or ſtrongly illuminates the objects; for mere day-light is not ſufficient for this purpoſe, the greateſt beauty in this phænomenon being the exquiſite appearance and contraſts of lights and ſhadows, none of which can appear but from an object placed in the ſun-beams, without which every thing looks dark and dull, and makes a diſagreeable figure.

Therefore, ſeventhly, the window or the ſide of the room where the ſcioptic ball is uſed, ought to look towards that quarter directly upon which the ſun ſhines, that ſo the illuminated ſides of objects may preſent themſelves to the lens, and appear more glorious in the picture.

Eighthly, It is eaſy to infer, that the beſt time of the day for this experiment is about noon, becauſe the ſun-beams are ſtrongeſt, and of courſe the picture moſt luminous and diſtinct: alſo that a north window is the beſt; though for viewing the ſhadows in great perfection, an eaſt or weſt window will anſwer the end beſt.

Ninthly, As the image is formed only by the reflected rays of the ſun, ſo due care ſhould be taken that none of the ſun's direct rays fall on the lens in the window; for if they do, they will by mixing with the former greatly diſturb the picture, and render it very confuſed and unpleaſant to view.

Tenthly, As white bodies reflect the incident rays moſt copiouſly, and black ones abſorb them moſt; ſo, to make the picture moſt perfect, it ought to be received upon a very white ſurface, as paper, painted cloth, a wall, &c. bordered round with black; ſo that the collateral rays which come from on each ſide the object may be ſtifled, and not ſuffered to diſturb the picture by reflection.

Theſe are the neceſſary precautions for the due ordering of the various circumſtances of this experiment. We ſhall now enumerate the principal phænomena of the dark chamber. The firſt of which is, that an exact and every way ſimilar image is formed of an external object; for pencils of rays, coming from all parts of the object, will repreſent thoſe points in ſuch a manner and poſition, as will be very proportional and correſpondent in their reſpective poſitions and diſtances in the object; ſo that the whole in the image ſhall bear an exact ſimilitude or likeneſs of the object in every reſpect.

The ſecond phænomenon is, that the image will bear the ſame proportion to the object, whether a line, ſuperficies, or ſolid, as their diſtances from the glaſs reſpectively: this is evident from what will be obſerved under *Convex* Lens. Hence the larger the focal diſtance of the glaſs, the more ample will be the picture of the ſame object, but the leſs will be the ſpace or compaſs of the plan, or reſpective view.

The third phænomenon is, that the image or picture of the object is inverted; and this is not the effect of the glaſs, but the croſſing the rays in the hole through which they paſs into the room; for if a very ſmall hole was made in the window-ſhutter of a darkened room, the objects without would be all ſeen inverted, thoſe which come from the upper part of the object going to the lower part of the image, and *vice verſa*. All that the glaſs does is to render the image diſtinct, by converging the rays of every pencil to their proper focus in the picture, the poſition of each point being the ſame as before.

The fourth phænomenon is the motion or reſt of the ſeveral parts of the picture, according as thoſe in the object are in either ſtate. The reaſon of this is very obvious; and this is what gives life and ſpirit to the painting and portraits of nature, and is the only particular inimitable by art. And, indeed, a more critical idea may be formed of any movement in the picture of a darkened room, than from obſerving the motion of the object itſelf: for inſtance, a man walking in a picture appears to have an undulating motion, or to riſe up and down every ſtep he takes; whereas nothing of this kind is obſerved in the man himſelf, as viewed by the naked eye.

The fifth phænomenon is the colouring of the optic picture; every piece of imagery has its proper tints and colours, and thoſe always heightened and rendered more intenſe than in the object; ſo that in this reſpect it is an improvement of nature itſelf; whereas the art of the greateſt maſter can only pretend to a diſtant reſemblance and faint imitation. The reaſon why the image is coloured is, becauſe the ſeveral points of the object reflecting ſeveral ſorts of coloured rays to the glaſs, thoſe rays will give a repreſentation of thoſe ſeveral parts reſpectively, and in their own colour, and therefore in thoſe of the object; but thoſe colours will be heightened, becauſe they are crouded into a leſs ſpace.

The ſixth phænomenon is the claro oſcuro, as the Italians call it; that is, the intenſity of light and ſhadow in the picture: and this as well as the colouring is greatly heightened, above what it is in the object, by reaſon of the leſſer area of the picture. Here every light and every ſhade is expreſſed in its proper degree, from the moſt brilliant in the one to the moſt jetty black of the other, incluſive of a wonderful variety in the ſeveral parts, ariſing from the different ſituations of the ſeveral parts of the object, and the different angles of reflection. A juſt imitation of nature in the diſtribution of light and ſhadows is, perhaps, the moſt difficult part of the art of painting, and on which its greateſt perfection depends.

The ſeventh phænomenon is the optical perſpective, or projection of the image, which is not in plano, or on a plane, as in common perſpective, but on a ſurface deſcribed by the revolution of a conic ſection about its axis; therefore, though in general a plane ſurface is made uſe of, and may do very well in large repreſentations; yet in ſmaller ones, as thoſe of the portable Camera's, it is neceſſary to have the image or picture complete, or every where well defined, that it be received upon the ſurface of an elliptic figure, and ſuch as is ſuited to the middle diſtance of the objects: but this is a nicety which few will think worth regarding, who do not aim at a very great accuracy indeed in what they do.

We ſhall finiſh this ſubject with an obſervation that may be uſeful to perſons concerned in drawing; and that is, that if an object be placed juſt twice the focal diſtance from the glaſs without, the image will be formed at the ſame diſtance from the glaſs within the room, and conſequently will be equal in magnitude to the object itſelf.

CAMERARIA, in botany, a genus of plants, the flower of which is a petal of a funnel-form, with a cylindraceous long tube, ventricoſe both at the baſe and the top, a plane limb divided into five lanceolated ſegments: the fruit is compoſed of two oblong follicles, bent horizontally, obtuſe at both ends, and ſending out a lobe on each ſide, near the baſe; they have one cell, with one valve, containing numerous, oval, and imbricated ſeeds, inſerted in a large oval membrane, at the baſe.

CAMERATED, among builders, the ſame with vaulted or arched.

CAMERONIANS, a party of preſbyterians, which ſprung up in Scotland, in the reign of king Charles II. They affirmed that the king had forfeited his right to the crown, by breaking the ſolemn league and covenant, which were the terms on which he received it. They pretended both to dethrone and excommunicate him; and broke out into an open rebellion. Upon the Revolution, they were reconciled to the kirk, and their preachers ſubmitted to the general aſſembly of the church of Scotland, in 1690.

CAMISADE, in the art of war, an attack by ſurprize in the night, or at the break of day, when the enemy is ſuppoſed to be a-bed.

CAMISARDS, a name given by the French to the Calviniſts of the Cevennes, who formed a league, and took up arms in their own defence, in 1688.

CAMLET, or Camblet. See the article Camblet.

CAMLETINE, a ſlight ſtuff, made of hair and coarſe ſilk, in the manner of camblet. It is now out of faſhion.

CAMOMILE. See the article Chamæmelum.

CAMP, the ground upon which an army pitch their tents. It is marked out by the quarter-maſter-general, who appoints every regiment their ground.

The chief advantages to be minded in chooſing a camp for an army, are to have it near the water, in a country of forage, where the ſoldiers may find wood for dreſſing their victuals; that it have a free communication with garriſons, and with a country from whence it may be ſupplied with proviſions; and, if poſſible, that it be ſituated on a riſing ground in a dry gravelly ſoil. Beſides, the advantages of the ground ought to be conſidered, as marſhes, woods, rivers, and incloſures; and if the camp be near the enemy, with no river or march to cover it, the army ought to be intrenched. An army always encamps fronting the enemy; and generally in two lines, running parallel about five hundred yards diſtance, the horſe and dragoons on the wings, and the foot in the center: ſometimes a body of two, three, or four brigades is encamped behind the two lines, and is called the body of reſerve. The artillery and bread waggons are generally encamped in the rear of the two lines. A battalion of foot is allowed eighty or an hundred paces for its camp; and thirty or forty for an interval betwixt one battalion and another. A ſquadron of horſe is allowed thirty for its camp and thirty for an interval, and more if the ground will allow it.

The diſpoſition of the Hebrew encampment was at firſt laid out by God himſelf: their camp was of a quadrangular form, ſurrounded with an incloſure of the height of ten hands breadth. It made a ſquare of twelve miles in compaſs, about the tabernacle; and within this was another, called the Levites camp. The Greeks had alſo their camps, fortified with gates and ditches. The Lacedæmonians made their camp of a round figure, looking upon that as the moſt perfect and defenſible of any form: we are not, however, to imagine, that they thought this form ſo eſſential to a camp, as never to be diſpenſed with, when the circumſtance of the place required it. Of the reſt of the Grecian camps, it may be obſerved, that the moſt valiant of the ſoldiers were placed at the extremities, the reſt in the middle. Thus we learn from Homer, that Achilles and Ajax were poſted at the ends of the camp before Troy, as bulwarks on each ſide of the reſt of the princes.

The camps of the Romans were generally of an exact ſquare form, or elſe oblong; though this, without doubt, was often accommodated to the ſituation of the place. They were always fortified, and a very exact diſcipline maintained in them, in order to prevent ſurprizes from the enemy.

Camp is alſo uſed by the Siameſe, and ſome other nations in the Eaſt-Indies, as the name of the quarters which they aſſign to the foreigners who come to trade with them.

In theſe camps, every nation forms, as it were, a particular town, where they carry on all their trade, not only keeping all their warehouſes and ſhops there, but alſo live in theſe camps with their whole families. The Europeans, however, are ſo far indulged, that at Siam, and almoſt every where elſe, they may live either in the cities or ſuburbs, as they ſhall judge moſt convenient.

Flying Camp, the ground on which a flying army is encamped.

Camp-Diseases are chiefly a bilious fever, malignant fever, ſcurvy, fluxes, &c. See the articles Fever and Campaign.

Camp-Hospital. See Hospital.

CAMPAIGN, in the art of war, denotes the ſpace of time that an army keeps the field, or is encamped, in oppoſition to quarters.

Concerning the healthineſs of the different ſeaſons of a campaign, the ingenious Dr. Pringle has the following obſervations: the firſt fortnight or three weeks is always ſickly, after which the ſickneſs decreaſes, and the men enjoy a tolerable ſtate of health throughout the ſummer, unleſs they get wet cloaths. The moſt ſickly part of the campaign is towards the end of Auguſt, while the days are ſtill hot, but the nights cold and damp, with fogs and dews; then, if not ſooner, the dyſentery prevails; and though its violence is over by the beginning of October, yet the remitting fever gaining ground, continues throughout the reſt of the campaign, and never entirely ceaſes, even in winter quarters, till the froſts begin. He likewiſe obſerves, that the laſt fortnight of a campaign, if protracted till the beginning of November, is attended with more ſickneſs than the two firſt months of the encampment; ſo that it is better to take the field a fortnight ſooner, in order to return into winter-quarters ſo much the earlier.

As to winter-expeditions, though ſevere in appearance, he tells us, they are attended with little ſickneſs if the men have ſtrong ſhoes, warm quarters, fuel, and proviſions enough.

CAMPANIFORM, or Campanulated, an appellation given to flowers reſembling a bell; a characteriſtic, whereon Tournefort eſtabliſhes one of his claſſes of plants. See the article Botany.

The word is compounded of the Latin, *campana*, a bell, and *forma*, reſemblance.

Of campaniform flowers, we meet with four varieties. 1. The bell-flower, properly ſo called. 2. The oblong or tubular bell-flower. 3. The bell-flower expanded to a great width at the mouth, and conſequently reſembling a baſon. 4. The globular, or roundiſh bell-flower; the mouth of which is narrower than its belly.

CAMPANULA, bell-flower, in botany, a genus of plants, the flower of which conſiſts of a campanulated ſingle petal; the baſe, broad and impervious; the limb lightly divided into five broad, acute, petalous ſegments. The nectarium is ſituated in the bottom of the carolla, and is formed of five acute connivent valves. The fruit is an angulated roundiſh capſule, with three or five cells, and having ſo many foramina in the ſides, for letting out the ſeeds. The ſeeds are numerous and ſmall, and the receptacle fixed and columnar.

CAMPEACHY Wood, *Campecia*, in botany, the ſame with the hæmatoxylum of Linnæus, otherwiſe called logwood.

It is brought to us in large and thick blocks or logs, and is the heart only of the tree which produces it. It is very heavy, and remarkably hard. It is not eaſily cut, but it ſplits pretty readily in a longitudinal direction.

Campeachy-wood muſt be choſen in large and thick pieces, ſound, and of a deep red colour. It has been long known among the dyers; but it is only of late that it has been introduced into medicine. It is found to be an excellent aſtringent, and is given in form of an extract, in diarrhœas, with very great ſucceſs.

CAMPHOR, in the materia medica, a body of a particular nature, being a mixed ſubſtance, dry, white, tranſparent and brittle, and of a very penetrating ſmell.

There are ſundry Indian plants from which camphors are obtainable, but only two which afford any large quantity, and from which this commodity is commonly prepared, one growing in Sumatra and Borneo, the other in Japan, as particularly about Satſuma. The firſt is called by Breynius *camphorifera Sumatrana, &c.* the camphor-tree of Sumatra, with leaves like thoſe of the clove-tree, but longer pointed, a large oblong fruit, and a very large cup, ſomewhat reſembling a tulip: the latter, *camphorifera Japonica, &c.* the camphor-tree of Japan, with bay-like leaves, a ſmall globular fruit, and a very ſhort cup. The camphor of the Japan ſpecies is the only ſort kept in the ſhops, the other being never brought into Europe. This tree is about the ſize of a large lime, the flowers are white, the fruit is a ſmall red berry. All the parts of it are impregnated with camphor, but the roots contain moſt: hence the roots are chiefly made uſe of for the preparation of this commodity; though in want of ſufficient quantities of theſe, the wood and leaves are mixed.

The camphor is extracted by diſtillation with water in large iron pots, on which are fitted earthen heads ſtuffed with ſtraw; greateſt part of the camphor concretes among the ſtraw in its cryſtalline form, and a part likewiſe paſſes down into the receiver along with the water. It is ſaid by ſome to be extracted by ſublimation without water; but by ſuch a proceſs, it could not avoid receiving from the woody matter an empyreumatic ſmell, which it is never found to have. The rough camphor, as firſt diſtilled, looks much like the grey, ſmall-cryſtalled Eaſt-Indian ſalt-petre, or like common bay-ſalt: in this ſtate, it is imported in caniſters into Europe, particularly into Holland, and there purified or refined.

The refining of camphor was formerly one of the manufactures of Venice, the Venetians being then the only people in Europe who traded directly to the Eaſt-Indies: but that trade has long ago paſſed into other hands; the Venetians now import little or no camphor, and the art of refining it is known only to the Dutch. The Engliſh and French import ſome rough camphor, but ſend it to Amſterdam to be refined, having never been able to ſucceed in the proceſs themſelves. I have been in one of the largeſt refineries, in which there were fifty furnaces, all managed by women; and have ſeen the whole operation after the matter had been put into the veſſels, but no one is permitted to ſee it before. The purification is effected by ſublimation, but doubtleſs ſome additional matter is made uſe of for keeping down the impurities of the camphor. The ſublimation is performed in low flat-bottomed glaſſes placed in ſand; the camphor concretes, in the upper-part of the belly of the glaſs, into a ſolid cake, which, after the veſſel has been broke, is pared with a knife, and is now the refined camphor of the ſhops. Gronovius has given a good account of the method of managing the ſublimation.

Pure camphor is a dry, colourleſs, tranſparent moſs, in appearance reſembling a ſalt, ſo light as to ſwim on water, moderately compact, yet eaſy to break, though not reducible by itſelf into fine powder, ſoft, and as it were ſaponaceous to the touch; when rubbed betwixt the fingers, of a ſtrong penetrating ſmell, and an acrid aromatic taſte, very eaſily inflammable, and ſo volatile as to exhale totally in a warm air. From theſe properties, it is obvious that camphor cannot be adulterated, much leſs counterfeited, as ſome ridiculouſly pretend, with tallow, maſtich, and ſpirit of wine. In order to preſerve this volatile concrete from any loſs in keeping, the ancients covered it with certain ſeeds, doubtleſs with a view to the more effectual excluding of the air: ſome have been hence miſled into an abſurd conceit, that the ſeeds poſſeſſed ſome peculiar power of fixing the camphor; and it is at this time no uncommon practice to put up a few linſeeds, pepper corns, &c. along with it. The only method of preſerving camphor is, to keep it in a cool place ſecured from the air: if tied in papers or bladders, then put into leaden or tin caniſters, or glaſs or earthen veſſels, and ſet in a cool cellar, we need not be afraid of loſing a ſingle grain in many years. I have kept camphor tied in an ox's bladder in the heat of boiling water for an hour, without being able to perceive any ſmell ariſing from it during the coction, or any diminution in its weight.

Camphor, conſidered as a medicine, is a very warm diaphoretic and antiſeptic: it does not however heat the conſtitution ſo much as might be expected from its hot pungent taſte. I have been aſſured by an eminent phyſician, that a ſingle drop of oil of cinnamon, though generally containing a little expreſſed oil, heats more than ten grains of camphor, and an ounce of ſtrong ſpirit of wine, more than a whole dram. Camphor is employed likewiſe in fire-works, and in ſundry other arts, particularly for varniſhes. Camphorated varniſhes excellently preſerve both animal and vegetable bodies, and peculiarly reſiſt worms and other inſects. Camphor, in ſubſtance, alſo laid among clothes, preſerves them from moths.

Camphor diſſolves eaſily and plentifully in vinous ſpirits, and in oils; four ounces of rectified ſpirit will diſſolve three of camphor: when thus diſſolved, we need not fear that any part of it will be diſſipated in a warm air, at leaſt till all the ſpirit has exhaled firſt; for if the ſolution be committed to diſtillation, the ſpirit will all diſtil before any of the camphor begins to riſe; and even if ſet on fire, the ſpirit will firſt burn away, the camphor remaining untouched till the ſpirit is all conſumed, and then burning by itſelf with a quite different, ſmoky, ſooty flame. Among the mineral acids, the nitrous diſſolves it moſt eaſily and in largeſt quantity: one part of camphor diſſolves readily in two of ſpirit of nitre, but requires three of oil of vitriol, with the aſſiſtance of digeſtion: the diluted vitriolic acid does not diſſolve it at all; and the marine acts ſo languidly, that it may be doubted whether this acid diſſolves it any otherwiſe than by virtue of a portion of nitrous acid intermixed. Vinegar and other mild vegetable acids, and alkaline liquors, have no effect on it.

The nitrous and vitriolic ſolutions afford ſome very diſſimilar phænomena: the camphor abſorbs the more concentrated part of the nitrous ſpirit, and forms with it a fluid like oil, which floats on the ſurface: with the vitriolic acid it unites equably into one uniform liquor. To the nitrous acid it ſcarcely gives any tinge, the oil being but juſt ſenſibly yellowiſh, whilſt the ſolution in the vitriolic acid is at firſt conſiderably coloured, and on ſtanding becomes more and more ſo, changing at laſt to a quite dark reddiſh-brown. The vitriolic acid, if its quantity is large, deſtroys the ſmell of the camphor, which is not eaſily concealed by any other menſtruum. If water be mixed with the ſolutions made either in ſpirit of wine or in acids, the camphor inſtantly ſeparates, and reſumes its original appearance and qualities. The addition of ſilver, or quickſilver, to the nitrous ſolution, produces a like effect, the acid letting the camphor go, and attacking the metal. It is obſervable that no heat or efferveſcence ariſe during the diſſolution of camphor in the nitrous acid, which raiſes ſo violent a heat and ebullition with eſſential oils.

The principal preparations of camphor are, camphorated ſpirit of wine, and an oil of camphor. The camphorated ſpirit is no other than a ſolution of camphor in rectified ſpirit. Some have thought to unite the camphor and ſpirit more intimately together by diſtillation; but that proceſs, inſtead of uniting, ſeparates them. Hoffman and Rothe direct ſalt of tartar to be added previous to the diſtillation, and promiſe, by this method, a camphorated ſpirit, which will mingle with water, without any ſeparation of the camphor. This indeed the ſpirit will do; for there is ſcarcely any camphor in it: it is in ſome degree impregnated with the ſmell of that ſtrong-ſcented concrete; but the quantity of actual camphor that ariſes with it does not amount to above two grains in a quart: no wonder that with ſo ſmall a proportion there ſhould be no ſenſible milkineſs or precipitation.

There are ſundry oils of camphor prepared by diſtillation. One is made by diſtilling camphor from red bole or other loamy earths, and repeating the diſtillation from a freſh parcel of the earth, till the whole of the camphor is changed into an oil: this oil has by ſome been greatly eſteemed, as no camphor ſeparates from it on the admixture of water. I tried the proceſs with half an ounce of camphor, and two ounces of powdered red bole, mixing them well together, and urging them with a gradual fire in a retort: the camphor aroſe much ſofter than at firſt, and in ſome meaſure unctuous; and on diſtilling it over a ſecond time from the ſame quantity of bole, about one half of it became fluid. Both the liquor and the ſublimate being mixed with two ounces more of bole, and the diſtillation repeated, the whole of the camphor aroſe in the form of a fluid oil, with a little water, weighing together about an ounce. A part of the inflammable principle of the camphor appeared to be retained each time by the ferrugineous matter of the bole, all the reſidue being conſiderably black and ſparkling.

Another oil of camphor is prepared by digeſting one part of camphor with four parts of oil of turpentine, and then diſtilling them. Lemery relates, that camphor and oil of turpentine are of the ſame degree of volatility, and that they both diſtil perfectly together. I repeated the diſtillation in freſh retorts ſix times ſucceſſively, but always found a part of the camphor ſublimed by itſelf. There was alſo another more remarkable ſeparation; a portion of theſe ſubtile volatile bodies remaining every time at the bottom of the retort, and proving ſo fixed as to bear a red heat.

A third oil of camphor is made from camphor and Venice ſope, by diſtillation and cohobation, in the ſame manner as the two foregoing: this is called by ſome *oleum camphoræ arthriticum.* All the three have ſomewhat of an empyreumatic odour; and, conſidered as medicines, are of little or no conſequence. Camphor is one of thoſe drugs which art cannot improve, either for medicinal or mechanic uſes, and which are therefore to be given in their entire ſubſtance, or unchanged in their compoſition. All the aſſiſtance that the phyſician can in this caſe expect from the chemiſt, is, to diſcover the moſt commodious means of fitting the ſubject for exhibition.

For reducing camphor into powder, and thus fitting it for ſuch forms as receive powdery ingredients, it ſhould be moiſtened with a few drops of rectified ſpirit of wine, which will render it eaſily pulverable. Some endeavour to impregnate water with camphor, by ſetting the camphor on fire, and quenching it in water; but this is both an unfrugal and an ineffectual method. The beſt way of obtaining a watery ſolution of camphor is to grind it with almonds, in the proportion of about four ſcruples of almonds to half a dram of camphor: by this means the whole of the camphor will be rendered ſoluble in water into the form of an emulſion. By agitating and grinding it with the yolk of an egg, or mucilage, it becomes likewiſe miſcible with water: the yolk of one egg is ſufficient for about two ſcruples of camphor. Sugar, the common intermedium betwixt oily or reſinous bodies and water, anſwers leſs effectually for camphor, and lets go much ſooner on the admixture of watery liquors, than either almonds or yolk of eggs. *Neumann's Chemiſtry.*

Camphor has various uſes in fire-works, varniſhes, and medicine. In the laſt it is at preſent in high repute, eſpecially in all inflammatory, putrid, peſtilential, and maniacal diſeaſes. It is alſo given with advantage at the cloſe of the venereal diſtemper, mixed with the balſams, or fine turpentines.

CAMPION, in botany, a name ſometimes given to the lychnis. See the article LYCHNIS.

CAMPUS, in antiquity, a ſpace of ground in cities, left without any buildings, not unlike what we call fields or ſquares.

CAMPUS MAII, in ancient cuſtoms, an anniverſary aſſembly of our anceſtors held on May-day, when they confederated together for defence of the kingdom againſt all its enemies.

CAMPUS MARTIUS, among the Romans, a field by the ſide of the Tyber, where the youth exerciſed themſelves in warlike exerciſes. It was ſo called on account of a temple that ſtood on it, conſecrated to the god Mars. The conſuls Brutus and Collatinus made it the place for holding the comitia or aſſemblies of the people; and, in after-times, it was adorned with a great quantity of fine ſtatues.

CANADIAN *Philoſophy*. We are indebted for what we know of the ſavages of Canada, to the baron de Hontan, who reſided amongſt them near ten years. He tells us, that in ſome converſations with them, which he relates on the ſubject of religion, he did not always get the better in the diſpute. It is, indeed, ſurpriſing, a Huron ſhould uſe all the ſubtilty of logic to combat the Chriſtian religion, and be as perfect in every trick of the ſchools, as if he had ſtudied Scotus. It has been ſuſpected the baron had a mind to throw a ridicule on the religion he had been brought up in, and has put arguments in the mouth of a ſavage, he dared not make uſe of himſelf.

Thoſe who have neither ſeen nor read any authentic account of theſe ſavages, have conceited they were covered with hair; lived in the woods, like wild beaſts; had no ſociety, and bore but the figure of man: whereas theſe ſavages have really no hair on their bodies, excepting on their head and eye-brows, which many take pains to pull off: if accidentally a hair grows any where elſe, they are careful to pluck it out, even by the roots. They are born as white as Europeans, but their going naked, daubing themſelves with oil, and painting themſelves with different colours, which the ſun at laſt imprints on their ſkin, ſpoils their complexion: they are large men, ſuperior in ſtature to us; their features are regular; their noſe aquiline; are in general well-ſhaped; and it is a rarity to ſee any among them lame, blind, or deformed.

At firſt ſight, a man would ſcarce entertain a favourable opinion of theſe ſavages; they have a fierce look, a rough deportment, and on meeting each other, they are ſo ſilent, and ſhew ſo little emotion, that it would be difficult for an European, ignorant of their cuſtoms, to believe this their manner of civility, and the ceremony in faſhion among them. They make a great jeſt of our compliments, uſing but few outward demonſtrations of kindneſs; but are, however, good, affable, and exerciſe to ſtrangers and the unhappy a charitable hoſpitality, that may ſhame all the nations of Europe; and poſſeſs an evenneſs of mind which is neither altered by proſperity nor adverſity. This is in a great meaſure owing to their want of thoſe vices which luxury and abundance have introduced among us.

The following are the principal points of their religion and philoſophy.

1. All the ſavages maintain there is a God; his exiſtence they prove by the formation of the univerſe, which manifeſts the Almighty power of its author; from whence it follows, ſay they, that man is not the work of chance, but of a principle ſuperior in wiſdom and knowledge, which they call the great mind. This great mind contains all, appears in all, acts in all, and gives motion to all things. In ſhort, all we ſee, all we conceive, is this God, who ſubſiſts without bounds, and without body, ought not to be repreſented by any figure whatever, and therefore they adore him in all his works. This is ſo true, that when they ſee any thing remarkably fine, curious, or ſurpriſing, eſpecially the ſun and ſtars, they break out in this exclamation: Oh! great mind, we ſee thee every where!

2. They ſay the ſoul is immortal, becauſe, if it were not, all men would be equally happy in this life; for God, being infinitely perfect and wiſe, could not have created ſome for happineſs, and others for miſery; they maintain, that God, for certain reaſons, above our comprehenſion, wills, that a certain number of beings ſhould ſuffer in this world, that he may recompenſe them in the next; and therefore cannot bear to hear Chriſtians ſay, ſuch a one was unhappy, becauſe he was killed or burnt; aſſerting that what we call unhappineſs, is only in our ideas; becauſe nothing is done but by the will of this infinitely perfect Being, whoſe conduct can neither be uncertain nor capricious.

3. The Supreme mind has given men reaſon to enable them to diſcern good from evil, and to follow the rules of juſtice and wiſdom.

4. Tranquillity of the ſoul is highly pleaſing to the Supreme mind; that, on the contrary, he deteſts the tumult of the paſſions, which makes men wicked.

5. Life is a ſleep, death an awakening, which gives us intelligence of things viſible and inviſible.

6. The reaſon of man not being capable of lifting itſelf up to the knowledge of things above the earth, it is needleſs and troubleſome to dive into inviſible things.

7. After death, our ſouls go into a certain place, in which we cannot tell whether the good are happy, or evil unhappy; becauſe we know not whether our ideas of happineſs and miſery coincide with thoſe of the Supreme ſpirit or mind.

CANAL, *Canalis*, in hydrography, a kind of artificial river, made for the convenience of water-carriage.

The Dutch, or, if we can believe the relations of travellers, the Chineſe, who inhabit a country vaſtly more extenſive than that of the Dutch, have ſhewn the great advantages reſulting from canals to a trading people. The ancients often took great pains to make a communication, by water, from one place to another. Several of the kings of Egypt have endeavoured to join the Red-ſea with the Mediterranean, by a canal opened from the Red-ſea to one of the arms of the Nile, which diſcharges itſelf into the Mediterranean; and the Turkiſh emperor Solyman II. employed one hundred and fifty thouſand men upon this buſineſs to no purpoſe.

There are ſeveral large canals in France; that of Briere, begun under Henry IV. and finiſhed under Lewis XIII. eſtabliſhes a communication between the Loire and the Seine, by the Loing. There are forty-two ſluices upon it: but the greateſt and moſt wonderful work of that kind, and at the ſame time one of the moſt uſeful, is the junction of the two ſeas, by the canal of Languedoc, propoſed under Francis I. but not finiſhed till the time of Lewis XIV.

CANAL, in anatomy, a duct or paſſage through which any of the juices flow: as 1. The ſemi-circular canals, diſtinguiſhed by the epithets of the largeſt, the middle one, and the leaſt, in the labyrinth of the ear, opening by five orifices into the veſtibule. 2. The canals of the auditory nerve, viz. the common and larger, in which there are little apertures into the labyrinth, and the proper, narrower, and longer, terminating partly by a little aperture in the cavity of the cranium, and partly in the aqueduct of Fallopius. 3. The canalis arterioſus, between the pulmonary artery and the aorta of a fœtus, which ſerves for a peculiar circulation in the fœtus. 4. The naſal canal. 5. The canalis ſemilunaris. And 6. The canalis venoſus. See the articles FOETUS, NOSE, &c.

CANAL *of the Larmier*, the hollowed platfond or ſoffito of a cornice, which makes the pendent mouchette. See the articles LARMIER and SOFFITO.

CANAL *of the Volute*, in the Ionic capital, the face of the circumvolutions incloſed by a liſtel.

CANALICULATE, or CANALICULATED, ſomething hollowed in the manner of a canal; thus, we ſay, a canaliculated leaf, a canaliculated ſtalk.

CANARY-BIRD, *Paſſer Canarienſis*, the Engliſh name of the whitiſh fringilla, with the wings and tail greeniſh.

Canary birds are natives of the Canary Iſlands, whence they have got their name; but the melody of their voice is ſo ſweet, that there are few nations in Europe which do not keep them in cages, where they very readily breed.

CANARY-GRASS. See the article GRASS.

CAN-BUOY. See the article BUOY.

CANCER, the crab, in zoology, the name of one of the diviſions of ſquillæ, comprehending all thoſe with ſhort tails. See the article SQUILLA.

Crabs are a well-known ſhell-fiſh, of which there are a great many ſpecies; as the common large crab, the ſpider-crab, the Molucca-crab or king-crab, the little wooly-crab, the prickly long-armed-crab, &c.

CANCER, in ſurgery, a roundiſh unequal hard livid tumour, generally ſeated in the glandulous parts of the body, and at length appearing with turgid veins, ſhooting out from it ſo as to reſemble, as it is thought, the figure of the crab-fiſh, or, as others ſay, becauſe like that fiſh, when once it has got hold, it is ſcarce poſſible to drive it away.

Cancerous, or ſcirrhous tumours, often appear ſpontaneouſly without any evident cauſe, and ſeem peculiar to certain conſtitutions; at others, they may be accidental, or proceed from ſharp corroſive or other coagulating juices in the body, errors in the non-naturals, a ſtoppage of the neceſſary evacuations, contuſions, ſtagnation, or coagulation of the milk in the breaſt, &c. The immediate cauſe of a cancer ſeems to be a too corroſive volatile ſalt, approaching to the nature of arſenic, formed by the ſtagnation of humours, &c. Stolterſoth obſerves, that it has been frequently cured by mercury and ſalivation. Some take an ulcerous cancer to be nothing elſe but an infinite number of little worms, which devour the fleſh by degrees. The cancer is allowed to be the moſt terrible evil that befalls the body; it is uſually cured while yet a ſmall tumour of the bigneſs of a nut, or at moſt a ſmall egg, by extirpation; when it ſeizes the breaſt, or is burſt into an ulcer, amputation takes place. It begins without any pain, and appears at firſt like a chicory pea, but grows apace, and becomes very painful. The cancer ariſes principally on the lax and glandulous parts, as the breaſts and emunctories: it is moſt frequent in women, eſpecially ſuch, ſays Stolterſoth, as are barren, or live in celibacy. The reaſon of its appearing in the breaſts, more than other parts, is, they being full of glands, with lymphatics and blood veſſels among them, the ſmalleſt contuſion, compreſſion, or punction, extravaſates thoſe liquors, which grow by degrees acrimonious from the cancer. Hence the maſters of the art ſay, that a cancer is that in the glands, which a caries is in the bones, and a gangrene in the fleſhy part.

The cancer is, however, found in other ſoft ſpongy parts of the body; and there have been ſome found in the gums, belly, neck of the matrix, ureters, lips, noſe, cheeks, abdomen, thighs, and even the ſhoulders, as Stolterſoth proves. A cancer ariſing on the leg is called a lupus; or on the face or noſe, a noli me tangere. Cancers are divided, according to their ſeveral ſtages, into occult and open, or ulcerated: occult cancers are thoſe not arrived at their ſtate, or not yet burſt; ulcerated cancers are known by their roughneſs and fulneſs of holes, through which oozes a filthy ſtinking glutinous matter, frequently yellowiſh; by their pungent pain, which reſembles the pricking of pins; by their blackneſs, the ſwelling of the lips of the ulcer, and the veins about it, which are blackiſh, tumid, and varicoſe; ſometimes the extremities of the blood-veſſels are gnawed off, and the blood iſſues out; in a cancer of the breaſt the adjacent fleſh is ſometimes ſo conſumed, that one may ſee into the cavity of the thorax; it occaſions a ſlow fever, a loathing, oftentimes faintings, ſometimes a dropſy, and laſtly death.

Some cancerous tumours are moveable, others fixed; ſome inflamed, others paliſh, and attended with pain, heat, tenſion, and pulſation. In their beginning they are ſometimes no bigger than a pea, but often increaſe gradually to the ſize of a walnut, egg, &c. ſometimes alſo their growth is ſudden, and at others ſlow, ſo as to continue upon the increaſe many years together. When they ulcerate, the ſuppuration is generally partial, the matter they diſcharge ſeeming of an ill-colour, and very fœtid.

All cancers are dangerous, and ſeldom give way to the uſe of evacuating medicines, eſpecially when they lie deep, or ſeem owing to a particular conſtitution of the patient. They alſo prove more difficult to cure, according to their ſize, the nature and office of the part they affect, the age of the patient, &c. Some occult cancers, particularly thoſe which happen in the breaſts of women, may remain harmleſs to the body for ſeveral years, and without ulcerating; though, upon any external injury, they may afterwards increaſe, break, and ſoon prove mortal. In this caſe, every thing that ſuddenly raiſes the velocity of the blood ſhould be carefully avoided.

The learned Dr. Stork, of Vienna, has publiſhed two pieces on the virtues of cicuta, or hemlock, in cure of cancers, and given many remarkable caſes in which it was attended with ſucceſs. Experiments of the ſame kind have alſo been made in England, ſome of which have ſucceeded, while others have totally failed of ſucceſs: ſo that the virtues of the hemlock in curing this terrible diſeaſe are not yet properly eſtabliſhed. See the article CICUTA.

CANCER, in aſtronomy, one of the twelve ſigns of the zodiac, repreſented on the globe in the form of a crab, and thus marked, ♋, in books.

Ptolemy makes it contain only thirteen ſtars; Tycho Brahe fifteen; Bayer and Hevelius twenty-nine; and Flamſtead no leſs than ſeventy-one.

It is the fourth ſign, reckoning from aries, and gives name to one of the quadrants of the ecliptic.

Tropic of CANCER, in aſtronomy, a leſſer circle of the ſphere parallel to the equator, and paſſing through the beginning of the ſign cancer.

CANCEROUS, ſomething belonging to, or partaking of, the nature of a cancer. See the article CANCER.

CANDIDATE, a perſon who aſpires to ſome public office.

CANDLE, a ſmall taper of tallow, wax, or ſpermaceti; the wick of which is commonly of ſeveral threads of cotton, ſpun and twiſted together.

A tallow-candle, to be good, muſt be half ſheeps, and half bullocks tallow; for hogs tallow makes the candle gutter, and always gives an offenſive ſmell, with a thick black ſmoke. The wick ought to be pure, ſufficiently dry, and properly twiſted, otherwiſe the candle will emit an unconſtant vibratory flame, which is both prejudicial to the eyes, and inſufficient for the diſtinct illumination of objects.

There are two ſorts of tallow-candles; the one dipped, the other moulded: the former are the common candles; the latter are the invention of the Sieur le Brege, at Paris.

As to the method of making candles, in general, after the tallow has been weighed, and mixed in the due proportions, it is cut into very ſmall pieces, that it may melt the ſooner; for the tallow in lumps, as it comes from the butchers, would be in danger of burning or turning black, if it were left too long over the fire. Being perfectly melted and ſkimmed, they pour a certain quantity of water into it, proportionable to the quantity of tallow. This ſerves to precipitate to the bottom of the veſſel the impurities of the tallow which may have eſcaped the ſkimmer. No water, however, muſt be thrown into the tallow deſigned for the three firſt dippings; becauſe the wick, being ſtill quite dry, would imbibe the water, which makes the candles crackle in burning, and renders them of bad uſe. The tallow, thus melted, is poured into a tub through a coarſe ſieve of horſe-hair, to purify it ſtill more, and may be uſed after having ſtood three hours. It will continue fit for uſe twenty-four hours in ſummer, and fifteen in winter.

The wicks are made of ſpun cotton, which the tallow-chandlers buy in ſkains, and which they wind up into bottoms or clues: whence they are cut out with an inſtrument contrived on purpoſe, into pieces of the length of the candle required; then put on the ſticks or broches, or elſe placed in the moulds, as the candles are intended to be either dipped or moulded. Wax-candles are made of a cotton or flaxen wick, ſlightly twiſted, and covered with white or yellow wax. Of theſe, there are ſeveral kinds; ſome of a conical figure, uſed to illuminate churches, and in proceſſions, funeral ceremonies, &c.

For the method of making wax-candles, ſee the article Wax-Chandler.

Sale or Auction by Inch of Candle, is when a ſmall piece of candle being lighted, the byſtanders are allowed to bid for the merchandize that is ſelling; but the moment the candle is out, the commodity is adjudged to the laſt bidder.

There is alſo an excommunication by inch of candle, when the ſinner is allowed to come to repentance while a lighted candle continues burning; but after it is conſumed, he remains excommunicated to all intents and purpoſes.

Candle-Berry-Tree, in botany, the Engliſh name of a ſpecies of myrica, called alſo the Virginian myrtle, as being common in that country.

From the berries of this tree a green kind of wax is drawn by boiling, whereof they make candles; and hence is derived the candle berry-tree.

CANDLEMAS, a feaſt of the church held on the ſecond day of February, in honour of the purification of the Virgin Mary. It is borrowed from the practice of the ancient Chriſtians, who on that day uſed abundance of lights both in their churches and proceſſions, in memory, as is ſuppoſed, of our Saviour's being on that day declared by Simon, "To be a light to lighten the "Gentiles."

In imitation of this cuſtom, the Roman catholics, on this day, conſecrate all the tapers and candles which they uſe in their churches during the whole year. At Rome the pope performs that ceremony himſelf, and diſtributes wax-candles to the cardinals and others, who carry them in proceſſion through the great hall of the pope's palace. This ceremony was prohibited in England by an order of council in 1548.

CANDLESTICK, an inſtrument to hold a candle, made in different forms, and of all ſorts of matter.

The golden candleſtick was one of the ſacred utenſils made by Moſes to be placed in the Jewiſh tabernacle. It was made of hammered gold, a talent in weight. It conſiſted of ſeven branches, ſupported by a baſe or foot. Theſe branches were adorned at equal diſtances with ſix flowers, like lilies, and with as many bowls and knobs placed alternately. Upon the ſtock, and ſix branches of the candleſtick, were the golden lamps, which were immoveable, wherein were put oil and cotton.

Theſe ſeven lamps were lighted every evening, and extinguiſhed every morning. The lamps had their tongs or ſnuffers to draw the cotton in or out, and diſhes underneath them to receive the ſparks and droppings of the oil. This candleſtick was placed in the antichamber of the ſanctuary, on the ſouth-ſide, and ſerved to illuminate the altar of perfume, and the table of the ſhew-bread. When Solomon had built the temple of the Lord, he placed in it ten golden candleſticks, of the ſame form as that deſcribed by Moſes, five on the north, and five on the ſouth-ſide of the holy of holies. But after the Babyloniſh captivity, the golden candleſtick was again placed in the temple, as it had been before in the tabernacle by Moſes. This ſacred utenſil, upon the deſtruction of the temple by the Romans, was lodged in the Temple of Peace, built by Veſpaſian; and the repreſentation of it is ſtill to be ſeen on the triumphal arch at the foot of Mount Palatine, on which Veſpaſian's triumph is delineated.

CANDY, or *Sugar*-Candy, a preparation of ſugar, made by melting and cryſtalizing it ſix or ſeven times over, to render it hard and tranſparent. It is of three kinds, white, yellow, and red. The white comes from the loaf-ſugar, the yellow from the caſſonado, and the red from the muſcovado. See Sugar.

Sugar-candy is moſt proper in colds, becauſe it melts ſlowly, and thereby gives time to the ſaliva to mix with it, and thus to blunt the acrimony of the phlegm.

CANDYING, in pharmacy, the act of preſerving ſimples in ſubſtance, by boiling them in ſugar.

The performance of this originally belonged to the apothecaries, but is now become a part of the buſineſs of a confectioner.

CANE denotes a walking-ſtick; and it is cuſtomary to adorn it with a head of gold, ſilver, agate, &c. Some are without knots, and very ſmooth and even; others are full of knots, about two inches diſtant from each other. Theſe laſt have very little elaſticity, and will not bend ſo well as the others.

Canes of Bengal are the moſt beautiful which the Europeans bring into Europe. Some of them are ſo fine, that people work them into veſſels or bowls, which being varniſhed over in the inſide with black or yellow lacca, will hold liquors as well as glaſs or china ware does, and the Indians uſe them for that purpoſe.

Cane, *Canna*, is alſo the name of a long meaſure; which differs according to the ſeveral countries where it is uſed.

At Naples, the cane is equal to 7 feet $3\frac{1}{2}$ inches Engliſh meaſure; the cane of Tholouſe, and the Upper Languedoc, is equal to the varre of Arragon, and contains 5 feet $8\frac{3}{4}$ inches; at Montpelier, Provence, Dauphine, and the Lower Languedoc, to 6 Engliſh feet $5\frac{1}{2}$ inches.

CANELLA ALBA, wild cinnamon, in the materia medica, the inner bark of a large bay-leaved tree, growing in the Low-lands of Jamaica, and other American iſlands; brought over in the form of quills; of which ſome are large and thick, taken from the trunk of the tree; others ſlenderer and thinner, from the branches having generally pieces of a wrinkled browniſh coat adhering to the outſide, lined on the inſide with a fine white membrane, breaking over with a cloſe even ſurface, and appearing internally of an unequal, pale, browniſh or yellowiſh white colour.

Canella alba has hitherto been rarely employed in medicine, unleſs as a ſubſtitute for winter's bark, which it pretty much reſembles, and has been commonly miſtaken for. The London college has now received it in two officinal compoſitions for alleviating the ill flavour of aloes. It is a moderately warm aromatic; of an agreeable ſmell, ſomewhat reſembling that of cloves, but far weaker; and of a pungent taſte, accompanied with a conſiderable bitteriſhneſs.

Infuſions of it in water are of a yellowiſh colour, and ſmell moderately of the canella; but in taſte are rather bitter than aromatic. Tinctures made in rectified ſpirit are of a darker reddiſh yellow colour, and have more of the aromatic warmth of the bark, but very little of its ſmell. Tinctures in proof ſpirit are more agreeable than either; this menſtruum diſſolving the aromatic as well as the bitter matter of the canella, without covering or ſuppreſſing its flavour like the pure ſpirit.

In diſtillation with water, it yields an eſſential oil, of a dark yellowiſh colour, of a thick tenacious conſiſtence, difficultly ſeparable from the aqueous fluid; in ſmell ſufficiently grateful, though rather leſs ſo than the bark itſelf: the remaining decoction, inſpiſſated, leaves an extract of great bitteriſhneſs; in conſiſtence not uniform, ſeemingly compoſed of a reſinous and gummy matter imperfectly mixed. On inſpiſſating the ſpirituous tincture, the ſpirit which diſtils has no great ſmell or taſte of the canella, but is ſo far impregnated with its more volatile oil as to turn milky on the admixture of water: the remaining extract retains the bitteriſhneſs of the bark, but has little more of its warmth or flavour than the extract made with water.

CANEPHORÆ, in Grecian antiquity, virgins who, when they became marriageable, preſented certain baſkets full of little curioſities to Diana, in order to get leave to depart out of her train, and change their ſtate of life.

CANEPHORIA, in Grecian antiquity, a ceremony which made part of a feaſt celebrated by the Athenian virgins, on the ève of their marriage day.

At Athens, the canephoria conſiſted in this: that the maid, conducted by her father and mother, went to the temple of Minerva, carrying with her a baſket full of preſents, to engage the goddeſs to make the marriage-ſtate happy; or, as the ſcholiaſt of Theocritus has it, the baſket was intended as a kind of honourable amends made to that goddeſs, the protectrix of virginity, for abandoning her party; or a ceremony to appeaſe her wrath. Suidas calls it a feſtival in honour of Diana. See Canephoræ.

Canephoria is alſo the name of a feſtival of Bacchus, celebrated particularly by the Athenians, on which the young maids carried golden baſkets full of fruit; which baſkets were covered to conceal the myſtery from the uninitiated.

CANICULA, or Caniculus, in aſtronomy, the ſame as the canis minor. See the article Canis Minor.

CANICULAR Days, commonly called dog-days, a certain number of days preceding and enſuing the heliacal riſing of canicula, or the dog-ſtar, in the morning. The Ethiopians and Egyptians began their year at the riſing of the dog-ſtar, reckoning to its riſe again the next year, which is called the annus canarius. The Romans ſuppoſed it to be the cauſe of the ſultry weather uſually felt in the dog-days; and therefore ſacrificed a brown dog every year at its riſing, to appeaſe its wrath.

The dog-days begin towards the end of July, and end the beginning of September.

CANINE, whatever partakes of, or has any relation with, the nature of a dog. Thus,

Canine Teeth, in anatomy, are two ſharp-edged teeth in each jaw; one on each ſide, placed between the inciſores and molares.

Canine Muscles, a pair of muſcles common to both lips. They ariſe from the hollow on each ſide under the os jugalis, in the os maxillare, and are inſerted into the angle of the lips.

Canine Appetite. See Bulimy.

CANIS, dog, in zoology, the name of a comprehenſive genus of quadrupeds, of the order of the feræ.

They are diſtinguiſhed from the other genera of this order, by the number of their teats, or paps, which in the dog kind are ten, four on the breaſt, and ſix on the belly: add to this, that their feet are adapted to running; they have five toes on the fore ones, and four on the hinder.

Canis Major, in aſtronomy, a conſtellation of the ſouthern hemiſphere, conſiſting of twenty-eight ſtars, according to Ptolemy; of thirteen, according to Tycho Brahe; and thirty-two in the Britannic catalogue.

Canis Minor, Caniculus, or Canicula, in aſtronomy, a conſtellation of the northern hemiſphere. In Ptolemy's catalogue, the canis minor comprehends two ſtars; in that of Tycho Brahe, five; and in the Britannic catalogue, fifteen.

CANISTER, a large tin-box, in which tea is brought from China. They are of ſeveral ſizes, holding from one pound to ten of that vegetable.

CANKER, a ſpeck made by a ſharp humour, which gnaws the fleſh almoſt like a cauſtic; very common in the mouths of children.

Canker *in Trees*, a term uſed by our farmers to expreſs a wound or blemiſh in the trunk of a tree, which does not heal up by nature, but will increaſe and damage, if not endanger the whole tree. Theſe wounds are ſometimes occaſioned by accidents, as blows, or by the branches of one tree galling another by the motion they are put into by the winds; if this latter be the caſe, the offending branch muſt be cut off, or drawn another way, or elſe all remedies are vain.

The wound muſt be cut and enlarged every way to the quick, and all the decayed wood muſt be taken clean out; then the whole internal ſurface of the wound muſt be rubbed over with tar mingled with oil; and after this it muſt be filled up with clay and horſe-dung mixed together, or with horſe-dung alone, which many eſteem beſt of all; in this caſe the dung muſt be bound over with a rag: hogs-dung is by many preferred to horſe-dung for this purpoſe; and it is proper to add to this application the keeping of the roots cool and moiſt, by laying fern and nettles about them. If the canker be only in one of the boughs of the tree, the ſhorteſt way is to cut off the bough at once; if that be a large one, it ſhould be cut off at ſome diſtance from the body of the tree; but if a ſmall one, it ſhould be cut off cloſe. The adding a coat of dung, and pond or river mud, about the roots of trees, if they are ſubject to this from their ſtanding in a dry barren land, as is often the caſe, is a very good cure.

CANNA, in botany, a genus of plants; the flower of which is monopetalous, and divided into ſix parts. The laciniæ are lanceolated, cohering at the baſes, of which the three exterior ones are erect; the three interior ones are longer than theſe, and two of them are erect, and one reflex. The fruit is a roundiſh, ſcabrous, coronated, triſulcated capſule, with three cells and three valves, containing ſome globoſe ſeeds.

CANNABIS, hemp, in botany. See Hemp.

CANNEQUINS, white cotton-linens brought from the Eaſt-Indies, a very proper commodity for trading on the coaſt of Guinea.

CANNEL-COAL, in the materia medica, a ſubſtance which has a long time, though with very little reaſon, been confounded, both by authors and druggiſts, with jet. It is dug up in many parts of England in great abundance, particularly in Lancaſhire, where it is burnt as common fuel. It is worked into toys and utenſils of various kinds, under the name of jet. In medicine, it has the credit of being good in the cholic, and of being, in general, an emollient and diſcutient: but the preſent practice takes no notice of it.

CANNON, a military engine for throwing balls, &c. by the help of gunpowder.

The invention of braſs cannon is aſcribed, by Larrey, to J. Owen, who ſays, that they were firſt known in England in the year 1535; but yet acknowledges that in the year 1346 there were four pieces of cannon in the Engliſh army, at the battle of Creſſy; and that theſe were the firſt that were known in France. And Mezeray relates, that king Edward, by five or ſix pieces of cannon, ſtruck terror into the French army, it being the firſt time they had ſeen ſuch thundering machines.

The matter of which cannons are made is metal, either iron or braſs, or rather a mixture of copper, tin, and braſs. The mixture of tin is deſigned to make the metal more compact and denſe; ſo that the heavier the copper is, the leſs tin it requires. It is uſual to add eight pounds of braſs and ten pounds of tin to one hundred pounds of copper; but ſometimes they uſe ten pounds of tin, ten pounds of lead, and five pounds of braſs.

The Swedes, during the long war in the laſt century, are ſaid to have uſed cannons made of leather; but theſe were too apt to burſt to be of any great ſervice.

The parts and proportions of cannon about eleven feet long are: the barrel or cavity nine feet; its fulcrum or ſupport fourteen; and its axis ſeven; the diameter of the bore at the mouth ſix inches two lines; the plug of the ball two lines; the diameter of the ball therefore ſix inches, and its weight thirty-three ½ pounds; the thickneſs of the metal about the mouth two inches; and at the breech ſix; the charge of powder from eighteen to twenty pounds. It will carry a point-blank ſix hundred paces, and may be loaded ten times in an hour, and ſometimes fifteen.

Cannons are diſtinguiſhed by the diameters of the balls they carry. The rule for their length, &c. is, that the whole charge of powder be on fire before the ball quit the piece. If it be made too long, the quantity of air to be driven out before the ball, will give too much reſiſtance to the impulſe: and that impulſe ceaſing, the friction of the ball againſt the ſurface of the piece will leſſen its velocity.

Formerly cannon were made much longer than they are at preſent; but ſome being, by chance, made two feet

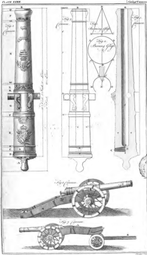


Fig. 3 Cannon
Fig. 1 Cannon
Fig. 5 Burning Glass
Fig. 4 Burning Glass
Fig. 2 Cannon
Fig. 6 Cannon
Fig. 7 Cannon

and a half ſhorter than ordinary, it was found that they threw a ball with a greater impetus through a leſs ſpace than the larger. This was confirmed by Guſtavus Adolphus in the year 1624; an iron ball of 48 pounds weight being found to go farther from a new ſhort cannon, than another ball of 96 pounds out of a longer piece: whereas in other reſpects it is certain the larger the bore and ball, the greater the range.

The greateſt range of a cannon is ordinarily fixed at 45 deg. but Dr. Halley ſhews it to be at 44$\frac{1}{2}$. M. S. Julien adjuſts the ranges of the ſeveral pieces of cannon, from the weight of the ball they bear, the charge of powder being always ſuppoſed to be in a ſubduplicate ratio to the weight of the ball.

Weight of a Leaden Ball.	Horizontal Range.	Greateſt Range.
℔.	Paces.	Paces.
33	600	6000
24	700	6000
16	800	8000
12	450	5000
8	400	1500
6	150	1500

Experience has ſhewn, that two cannons being of equal bore, but different lengths, the longer requires a greater charge of powder than the ſhorter. The ordinary charge of cannon is to have the charge of its powder half that of its ball.

The names of the ſeveral cannon, their length, weight, and that of their balls, as they obtain among us, are as in the following table:

Names of Cannon.	Wt. of an Iron Ball.		Wt. of the Cannon.	Length of the Cannon.	
	℔.	oz.	℔.	Feet.	Inch.
Cannon royal - -	48	0	8000	12	0
Demi cannon large -	36	0	6000	12	0
Demi cannon ordinary	32	0	5600	12	0
Demi cannon leaſt -	30	0	5400	11	0
Culverin largeſt - -	20	0	4800	12	0
Culverin ordinary - -	17	5	4500	12	0
Culverin leaſt - - -	15	0	4000	11	0
Demi culverin ordinary	10	11	2700	11	0
Demi culverin leaſt -	9	0	2000	10	0
Saker ordinary - -	6	0	1500	10	0
Saker leaſt - - -	4	12	1400	8	0
Minion largeſt - -	3	12	1000	8	0
Minion ordinary - -	3	4	800	7	0
Falcon - - - -	2	8	750	6	0
Falconet - - - -	1	5	400	5	6
Rabinet - - - -	0	8	300	5	6
Baſe - - - - - -	0	5	200	4	6

Cannons are made cylindrical, that the motion of the ball may not be retarded in its paſſage, and that the powder, when on fire, may not ſlip between the ball and the ſurface of the cannon, which would hinder its effect.

Wolfius would have the cannon always deceaſe as it goes towards the mouth or orifice; becauſe the force of the powder always decreaſes in proportion to the ſpace through which it was expanded.

The new cannon, that are made after the Spaniſh manner, have a cavity or chamber at the bottom of the barrel, which helps their effect.

A cannon is found to recoil two or three paces after the exploſion, which by ſome is accounted for from the air's ruſhing violently into the cavity as ſoon as the ball has been diſcharged; but the real cauſe is, the powder's acting equally upon the breech of the cannon and the ball. The plate annexed will ſufficiently explain the various terms given to the different parts of a piece of ordnance.

Explanation of Plate XXXII.

Fig. 3. repreſents a twenty-four pounder, or a cannon which carries a ball of twenty-four pounds. A, the caſcabel or pummel. B, the breech or coil. C, the field of the touch-hole. D, the baſe ring. E, firſt reinforcement. F, reinforced ring. G, ſecond reinforcement. H, handles in the form of dolphins for the more eaſily mounting or diſmounting the piece. I, I, the trunnions. K, the trunnion ring. L, the ornament of the chaſe. M, band of the ornament. N, the chaſe. O, the corniſh ring. P, the corniſh. Q, the muzzle ring. R, the mouth. S, the touch-hole.

Fig. 4. a longitudinal ſection by a horizontal plane of the ſame piece, in order to ſhew the thickneſs of the metal from the breech to the muzzle. The two dotted parallel lines in the middle of the figure, ſhew the bore or chaſe of the cannon. *a b*, the little chamber, or the canal of communication between the chamber of the piece and the touch-hole.

Fig. 5. a longitudinal ſection by a vertical plane. The parts marked *e*, *e*, ſhew the thickneſs of the metal from the breech to the muzzle. *f*, the cavity, or bore of the piece. *d b*, the little chamber. C *d*, the touch-hole, which is drilled through a maſs of pure copper. The maſs is repreſented by the ſhaded part *a b* C.

Fig. 6. a cannon mounted upon its carriage. M, the cheek or after-train of the carriage.

Fig. 7. repreſents the manner of drawing pieces of artillery from one place to another. A, the after-train of the piece. B, the fore-train. The two trains are connected together by means of an iron pin fixed perpendicularly in the fore-train, and paſſing through a pole in the after-train.

CANNULA, in ſurgery, a tube made of different metals, principally of ſilver and lead, but ſometimes of iron.

They are introduced into hollow ulcers, in order to facilitate a diſcharge of pus or any other ſubſtance; or into wounds, either accidental or artificial, of the large cavities, as the thorax or abdomen: they are uſed in the operation of bronchotomy, and by ſome, after cutting for the ſtone, as a drain for the urine.

Other cannulas are uſed for introducing cauteries, either actual or potential, in hollow parts, in order to guard the parts adjacent to that to be cauterized from injury. They are of various figures; ſome being oval, ſome round, and others crooked.

CANOE, a ſort of boat formed of the trunk of a tree hollowed; and ſometimes compoſed of ſeveral pieces of the bark ſewed together.

They are uſed on various occaſions, as fiſhing, paſſage, trade, &c. and are of ſeveral ſizes, according to the different uſes for which they are deſigned in different countries. They are generally rowed with paddles, which are pieces of light wood, nearly reſembling a corn ſhovel; and inſtead of moving the paddle horizontally like an oar, they row perpendicularly: the ſmall ones are very narrow, having only room for one perſon in breadth, and eight or ten lengthwiſe. They very rarely carry ſail, unleſs when going before the wind; and their ſails are made of a ſort of ruſhes or ſilk-graſs; they ſeldom have any rudder, the want of which is ſupplied by a dexterous management of the hind-oars: the Indians who navigate them are very expert in rowing uniformly, and in balancing them properly with their bodies, which would be difficult for a ſtranger to do, how well accuſtomed ſoever to the conducting of our boats, on account of the extreme lightneſs of the canoes, and aptneſs to be overturned. The negroes in Guinea, and even many in the Eaſt-Indies, uſe them. The American Indians, when they are neceſſitated to land on account of a water-fall, or other occaſion, carry their canoes on their heads or ſhoulders, till they arrive at ſome place where they may again be launched.

In the Repoſitory of the Royal Society is the model of a Greenland canoe, covered with ſeal ſkins, and reſembling a great bladder; ſo that however the waves daſh over it, the perſon who manages it ſits ſafe.

CANON, in eccleſiaſtical affairs, a perſon who poſſeſſes a revenue allotted for the performance of divine ſervice in a cathedral or collegiate church.

CANON *of Scripture*, a catalogue or liſt of the inſpired writings; or ſuch books of the Bible as are called canonical, becauſe they are in the number of thoſe books which are looked on as ſacred, in oppoſition to thoſe which either are not acknowledged as divine books, or are rejected as heretical and ſpurious, and are called apocryphal.

The canon of Scripture may be conſidered either as Jewiſh or Chriſtian with reſpect to the ſacred writings acknowledged as ſuch by the Jews, and thoſe admitted by the Chriſtians.

The firſt canon, or catalogue of the ſacred books, was made by the Jews, but who was the author of it is not ſo certain. The five books of Moſes were, queſtionleſs, collected into one body within a ſhort time after his death; ſince Deuteronomy, which is an abridgment of the other four, was laid in the tabernacle near the ark, according to the command he gave to the Levites: ſo that the firſt canon of the ſacred writings conſiſted only of the five books of Moſes. There were no more added to them till the diviſion of the ten tribes; ſince the Samaritans acknowledged none elſe. However, ſince Moſes, there were ſeveral prophets and other writers divinely inſpired, who compoſed either the hiſtory of their times, or prophetical books, and divine writings, or pſalms to the praiſe of God; but it cannot be diſcovered that, any time before the captivity, they were collected into one body, and comprized under one and the ſame canon. It is evident that, in our Saviour's time, the canon of the Holy Scripture was already drawn up, ſince he cites the law of Moſes, the prophets, and the pſalms, which are the three ſorts of books of which that canon is compoſed, and which he often ſtyles the Scripture, or the Holy Scripture.

It is generally received that Ezra was the principal author of this canon, though Nehemiah had ſome ſhare in it; and that he re-eſtabliſhed, corrected, and ordered the ſacred books to be written in new characters.

The Jewiſh canon is generally called the canon of Ezra; but it is certain, that all the books were not received into the canon of the Scriptures in his time; for Malachi, it is ſuppoſed, lived after him; and, in Nehemiah, mention is made of Jaddua the high-prieſt, and of Darius Codomanus, a king of Perſia, who lived at leaſt a hundred years after his time. Dr. Prideaux, with great appearance of reaſon, ſays, it is moſt probable, that the two books of Chronicles, Ezra, Nehemiah, and Eſther, as well as Malachi, were afterwards added in the time of Simeon the Juſt; and that it was not till then that the Jewiſh canon of the Holy Scripture was fully completed. And, indeed, theſe laſt books ſeem very much to want the accuracy and ſkill of Ezra, in their publication; for they fall ſhort of the exactneſs found in the other parts of the Hebrew Scriptures. There are ſome authors who pretend, that the Jews have made one or more canons; and that they have added to the former the books of Tobit, Judith, Eccleſiaſticus, Wiſdom, and the Maccabees: but it is moſt evidently true, that the Jews had no other canon but that of Ezra, nor confeſſed any other books for ſacred, but thoſe it contains. The two aſſemblies of the ſynagogue, which, as it is pretended, were held for that purpoſe, are mere chimeras; nor have any ancient writers ſaid any thing of them.

As for the Chrſtian church, there is no doubt but it acknowledged thoſe books to be canonical, which were cited, as of divine authority, by Chriſt and his apoſtles; the ancient catalogues of the canonical books of the Old Teſtament, which are to be met with in Chriſtian writers, are conformable to the canon of the Jews, and contain no other books; the Chriſtian church, for ſeveral of the firſt ages, receiving the inſpired writings no further than the Jewiſh canon. The firſt, and moſt ancient catalogue of this kind, is that of Melito, biſhop of Sardis, who flouriſhed in the reign of Marcus Antoninus. It agrees with the Jewiſh canon, excepting his omiſſion of Eſther, and that he makes Ruth and Judges two books. Origen has given us a liſt of the ſacred books, in which he takes in Eſther, and joins Ruth with Judges. St. Gregory Nazianzen divides the books of Scripture into hiſtorical, poetical, and prophetical: he reckons twelve hiſtorical books, viz. the five books of Moſes, with Joſhua, Judges, Ruth, the two books of Kings, Chronicles, and Eſdras. Five poetical books, Job, Daniel, and the three books of Solomon. Five prophetical books, viz. four great prophets, and twelve ſmall ones. The council of Laodicea was the firſt ſynod in which the number of the canonical books was aſcertained; this council aſſigns only twenty-two books to the Old Teſtament, including Eſther, and joining Baruch and the Lamentations with Jeremiah. St. Epiphanius reckons twenty-ſeven canonical books of the Old Teſtament; yet he admits no more than are in the catalogue of Origen, and obſerves that the Jews had reduced them to twenty-two. The third council of Carthage, in the year 397, admitted the books of Wiſdom, Eccleſiaſticus, Tobit, Judith, and the two books of Maccabees, into the canon. The church of Rome has agreed herein with that of Africa; for Innocent I. in his letter to Exuperius, places the ſame books in the canon of Scripture, as pope Gelaſius, in the council held in the year 494; and the decree of pope Eugenius, and the canon of the council of Trent, agree with the canon of the council of Carthage. That the council of Trent had no prior authority to proceed on, excepting ſome ſlender pretence from the council of Carthage abovementioned, appears from the current teſtimony of the Latin church.

As to the canon of the New Teſtament, it is to be obſerved, that the four Evangeliſts, the Acts of the Apoſtles, all the Epiſtles of St. Paul, except that to the Hebrews, and the firſt Epiſtles of St. Peter and St. John, have been received as canonical by the unanimous conſent of all the churches in all times; the Epiſtle of St. James, that of St. Jude, the ſecond Epiſtle of St. Peter, and the ſecond and third Epiſtles of St. John, were not received by all the churches from the beginning, as canonical; but have ſince been acknowledged as genuine, and therefore admitted into the canon.

We muſt obſerve, that the canon of the New Teſtament was neither ſettled by any ſynod, or ſingle authority: this collection was formed upon the unanimous conſent of all the churches, who, by conſtant tradition, reaching to the apoſtolical age, had received ſuch a number of them as were written by inſpired authors.

CANON, in monaſtic orders, a book wherein the religious of every convent have a fair tranſcript of the rules of their order, frequently read among them, as their local ſtatutes.

CANON is alſo uſed for the catalogue of ſaints acknowledged and canonized in the Romiſh church.

CANON, in muſic, a ſhort compoſition of two or more parts, in which one leads, and the other follows: or it is a line of any length, ſhewing, by its diviſions, how muſical intervals are diſtinguiſhed according to the ratios, or proportions, that the ſounds terminating the intervals bear one to another, when conſidered according to their degree of being acute or grave.

CANONE CHIURO, or CANONE IN CERPO, in muſic, a perpetual figure writ upon one line with ſome marks, to ſhew when the parts that imitate are to begin and end.

CANON, in arithmetic, algebra, &c. is a rule to ſolve all things of the ſame nature with the preſent inquiry: thus, every laſt ſtep of an equation in algebra, is ſuch a canon; and if turned into words, is a rule to ſolve all queſtions of the ſame nature with that propoſed.

CANON-LAW, a collection of eccleſiaſtical laws, ſerving as the rule and meaſure of church government.

The power of making laws was exerciſed by the church before the Roman empire became Chriſtian. The canon-law that obtained throughout the Weſt, till the twelfth century, was the collection of canons made by Dionyſius Exiguus, in 520, the capitularies of Charlemaign, and the decrees of the popes, from Sircius to Anaſtaſius.

The canon-law, even when papal authority was at its height in England, was of no force when it was found to contradict the prerogative of the king, the laws, ſtatutes, and cuſtoms of the realm, or the doctrine of the eſtabliſhed church. The eccleſiaſtical juriſdiction of the ſee of Rome in England, was founded on the canon-law; and this created quarrels between kings and ſeveral archbiſhops and prelates, who adhered to the papal uſurpation.

Beſides the foreign canons, there were ſeveral laws and conſtitutions made here for the government of the church; but all theſe received their force from the royal aſſent; and if at any time the eccleſiaſtical courts did, by their ſentence, endeavour to enforce obedience to ſuch canons, the courts at common law, upon complaints made, would grant prohibitions. The authority veſted in the church of England of making canons, was aſcertained by a ſtatute of Henry VIII. commonly called the act of the clergy's ſubmiſſion; by which they acknowledged that the convocation had been always aſſembled by the king's writ; ſo that though the power of making canons reſided in the clergy, met in convocation, their force was derived from the authority of the king's aſſenting to, and confirming them.

The old canons continued in force till the reign of James I. when the clergy being aſſembled in convocation, the king gave them leave to treat and conſult upon canons, which they did, and preſented them to the king, who gave them the royal aſſent: theſe were a collection out of the ſeveral preceding canons and injunctions. Some of theſe canons are now obſolete. In the reign of Charles I. ſeveral canons were paſſed by the clergy in convocation.

CANONESS, in the Romiſh church, a woman who enjoys a prebend, affixed, by the foundation, to maids, without their being obliged to renounce the world, or make any vows.

CANONESSES *of St. Auguſtine*, or *Royal* CANONESSES, a kind of religious, who follow the order of St. Auguſtine, of which there are various congregations.

CANONICAL, ſomething belonging to, or partaking of, the nature of a canon: thus we read of canonical obedience, which is that paid by the inferior clergy to their ſuperiors, agreeably to the canon-law. See the article CANON-LAW.

We alſo meet with canonical life, canonical hours, &c. uſed much in the ſame ſenſe.

CANONICUM, in the Greek church, the name given to certain fees paid by the clergy to their prelates, for degrees of promotion.

CANONIST, a perſon ſkilled in, or who makes profeſſion of the canon-law. See the article CANON-LAW.

CANONIZATION, a ceremony in the Romiſh church, by which perſons deceaſed are ranked in the catalogue of the ſaints. It ſucceeds beatification.

Before a beatified perſon is canonized, the qualifications of the candidate are ſtrictly enquired into, in ſome conſiſtories held for that purpoſe; after which one of the conſiſtorial advocates, in the preſence of the pope and cardinals, makes the panegyric of the perſon who is to be proclaimed a ſaint, and gives a particular detail of his life and miracles; which done, the holy father decrees his canonization, and appoints the day.

On the day of canonization, the pope officiates in white, and their eminences are dreſſed in the ſame colour. St. Peter's church is hung with rich tapeſtry, upon which the arms of the pope, and of the prince or ſtate requiring the canonization, are embroidered in gold and ſilver. An infinite number of lights blaze all round the church, which is crowded with pious ſouls, who wait with a devout impatience, till the new ſaint has made his public entry, as it were, into Paradiſe, that they may offer up their petitions to him, without danger of being rejected.

The following maxim, with regard to canonization, is now obſerved, though it has not been followed above a century, viz. not to enter into the enquiries prior to canonization, till fifty years, at leaſt, after the death of the perſon to be canonized. By the ceremony of canonization, it appears that this rite of the modern Romans has ſomething in it very like the apotheoſis or deification of the ancient Romans, and in all probability owes its riſe to it; at leaſt, ſeveral ceremonies of the ſame nature are conſpicuous in both.

CANONRY, the benefice filled by a canon. It differs from a prebend, in that the prebend may ſubſiſt without the canonicate; whereas the canonicate is inſeparable from the prebend: again, the rights of ſuffrages, and other privileges, are annexed to the canonicate, and not to the prebend.

CANOPY, a magnificent covering, raiſed above an altar, throne, chair of ſtate, pulpit, and the like.

The word canopy comes from the Greek, κωνωπειον, a net ſpread over beds to keep off the gnats, from κωνωψ, a gnat.

CANQUES, a ſort of cotton cloth made in China, which they wear next their ſkin, and is properly their ſhirt.

CANTALIVERS, in architecture, pieces of wood framed into the front or other ſides of a houſe, to ſuſpend the mouldings and eaves over it.

Theſe ſeem, in effect, to be the ſame with modilions, except that the former are plain; and the latter carved: they are both a kind of cartouches, ſet at equal diſtances under the corona of the cornice of a building.

CANTAR, or CANTARO, in commerce, a weight uſed in Italy, particularly at Leghorn, to weigh ſome ſorts of merchandizes.

There are three ſorts of cantari, or quintals, one weighs 150 pounds, the other 151, and the third 160: the firſt ſerves to weigh allum and cheeſe, the ſecond is for ſugar, and the third for wool and cod-fiſh.

CANTATA, in muſic, a ſong or compoſition, intermixed with recitatives, airs, and different movements, chiefly intended for a ſingle voice, with a thorough baſs, though ſometimes for other inſtruments.

CANTERBURY-BELL, in botany, the name by which ſome call the campanula, or bell-flower.

CANTHARIDES, in the materia medica, a beautiful kind of fly or winged inſect, of a bright, ſhining, greeniſh-golden colour, with ſome admixture of bluiſh. They were formerly brought from Spain; and hence are ſtill commonly called Spaniſh flies. They are not, however, peculiar to that kingdom. France, ſome parts of Germany, and other countries, produce abundance. It is principally in the ſpring, and on poplar and aſh-trees, that they are met with.

The uſual way of killing them is by the ſteam of ſtrong or diſtilled vinegar. The flies are put into a clean pot, which is covered with a hair-cloth, and then inverted upon another pot containing the vinegar warmed by a little fire made underneath; the juncture of the two pots being cloſely luted to confine the ſteam. The flies are afterwards thoroughly dried, and packed up ſecure from the air. In long keeping, they fall by degrees into a greyiſh or browniſh light powder, and in this ſtate are unfit for uſe, their intrinſic qualities periſhing with their external form. The wings are the moſt permanent part, theſe remaining entire after the body of the fly has mouldered into duſt.

Cantharides, when freſh, have a ſtrong fetid ſmell: taſted, they make at firſt no impreſſion upon the tongue, but in a little while they diſcover a degree of acrimony and a kind of pitchy flavour. Applied to the ſkin, they raiſe a bliſter on the part. The uſual bliſtering plaſters are compoſed of powdered cantharides and ſome common plaſter, in the proportion of one part of cantharides, or two, ſix, eight, or more of the plaſter, according as the compoſition is required to be more or leſs active.

Taken internally, in the doſe even of a few grains, they generally occaſion violent irritation and inflammations. They act in a peculiar manner upon the kidneys, and the urinary and ſeminal veſſels: when applied only externally as a bliſter to remote parts, they often affect the bladder, and bring on a difficulty and pain in making water. They are nevertheleſs given inwardly in ſmall doſes, both with ſafety and advantage, in ſome refractory diſorders, which baffle the force of medicines of leſs activity. Dr. Græneveld, who was impriſoned in England for having ventured to exhibit them, publiſhed a treatiſe in defence of his practice and of the utility of the medicine. He employs camphor for correcting the virulence of the cantharides; but the beſt remedies againſt the ill effects of this, as of other ſtimulating drugs, are milk and expreſſed oils.

The ſtimulating power of cantharides is aſcribed by many to an acrimonious cauſtic ſalt. But experiment diſcovers in them no ſaline principle of any kind, till they have undergone the deſtructive action of fire. By the action of a ſtrong fire, a volatile alkaline ſalt is producible equally from all animal ſubſtances; the ſame ſalt, and no other, is obtained from cantharides. It is pretty remarkable that thoſe who deduce the virtue of this inſect from an imaginary ſalt, employ, for extracting its virtue, not water, which is the direct and proper menſtruum of ſalts, but vinous ſpirits; and thus, in their practice, contradict their own theory.

Others, in order to account for the ſingular qualities of this inſect, have had recourſe to its mechanic ſtructure; to its ſharp, pointed, needled, ſword-like particles, lacerating the parts of animal bodies which they come in contact with. The microſcope indeed diſcovers ſome fine pointed filaments on the belly of the fly: but theſe are only hairs, too ſoft and flexible to wound or injure the ſkin. Cantharides communicate all their activity to vinous ſpirits, without loſing any thing of their form: bare pulverization deſtroys their ſpicular appearance, without abating their acrimony or cauſticity. It is not by virtue of their mechanic ſtructure, but of their intrinſic properties, that they ſtimulate, lacerate, and corrode.

If we may be allowed, in analogy to the vegetable kingdom, to apply the name of reſinous to that principle in animal ſubſtances which rectified ſpirit of wine diſſolves; the native principles of cantharides are, a reſinous, gelatinous, and earthy matter; and the principle, in which their activity ſolely and wholly reſides, is the reſin.

Four ounces of the flies, boiled in water, gave two ounces, all but two ſcruples, of gelatinous extract; after which, rectified ſpirit extracted twenty-eight grains of reſin, the indiſſoluble earthy reſiduum weighing two ounces and one ſcruple. The ſame quantity of the flies, treated firſt with ſpirit, yielded ſix drams two ſcruples of reſinous extract; and afterwards with water, three drams twelve grains of a gelatinous one: the reſiduum amounted here to ſix drams more than in the former way of extraction.

The reſinous extract is acrid and nauſeous to the taſte, and bliſters the ſkin like the fly in ſubſtance; whilſt the gelatinous matter, freed from the reſinous, proves like the earthy part, inſipid and inactive. In diſtillation, rectified ſpirit brings over little or nothing: the diſtilled water has a conſiderable ſhare of taſte and ſmell, but exhibits no appearance of oil.

The ſafeſt and moſt commodious form for taking cantharides internally, is the ſpirituous tincture, which, dropt into watery or vinous liquors, mingles uniformly, without precipitation or turbidneſs. Two drams of the cantharides, bruiſed a little, are commonly digeſted about two days in a pint and a half of proof ſpirit, with the addition of half a dram or more of cochineal as a colouring ingredient: ſome employ rectified ſpirit, that after it has extracted the virtue of the cantharides, it may be able to diſſolve a further addition of an ounce and a half of balſam of copaiba; to which other ingredients alſo have been joined, that ſeem to be of no great conſequence in the ſmall doſe to which the medicine is neceſſarily limited by the cantharides. Theſe tinctures are uſually given from fifteen to thirty or more drops twice a day: the moſt certain method of obtaining, without danger, the full effect of the cantharides, is to begin with the ſmaller doſe, and increaſe it by two or three drops at a time, till a little uneaſineſs is perceived in making water; after which, the medicine being intermitted for a day or two, the doſe is to be diminiſhed a little, and continued juſt below the quantity which produced that effect.

A ſoft extract of cantharides is in many caſes preferable, for external purpoſes, to the ointments and plaſters made with the powdered fly, particularly for the dreſſing of perpetual bliſters; as it acts more uniformly than the compoſitions containing the fly in ſubſtance, and occaſions leſs pain in the dreſſing. Hoffman's mild bliſter, which gives little pain, mentioned now and then in his works, ſeems to have been, or to have had for its baſis, a preparation of this kind: and probably the empyrical perpetual bliſter is no other. The college of Edinburgh have now received a compoſition on the ſame principle; they direct an ounce of cantharides to be infuſed for a night in a proper quantity of boiling water, the liquor to be ſtrongly preſſed and ſtrained out, and boiled with two ounces of hogs-lard till the humidity is waſted; after which, an ounce of white reſin, an ounce of yellow wax, and two ounces of Venice turpentine, are to be added, and the whole well mixed, ſo as to form a ſmooth ointment.

CANTHI, in anatomy, cavities at the extremities of the eye-lids, commonly called the corners of the eye: the greater of them, or the greater canthus, is next the noſe; the leſſer, or the little canthus, lies towards the temple.

CANTHUS, in chemiſtry, the lip of a veſſel, or that part of it which is a little hollowed or depreſſed, for the eaſy pouring off of liquors.

CANTICLES, a canonical book of the Old Teſtament. The Talmudiſts aſcribe it to Hezekiah, but the learned are agreed that king Solomon was the author of it; and his name is prefixed to it in the title of the Hebrew text, and of the ancient Greek verſion.

It is a kind of epithalamium, in the form of an idyllium or bucolic, in which are introduced, as ſpeakers, a bridegroom, a bride, the friends of the bridegroom, and the companions of the bride. The bridegroom and bride expreſs their love for each other in very tender and affectionate terms; for which reaſon the Jews never allowed this book to be read by any, till they were at leaſt thirty years of age.

Some authors are of opinion, that Solomon's deſign in this piece, was to deſcribe his amour with Abiſhag the Shunamite, or with the daughter of Pharaoh: on the contrary, others take it to be wholly allegorical, and underſtand it of the ſpiritual love of God towards his church. Some have pretended to diſcover in it five ſcenes; but others, with more juſtneſs, diſtinguiſh it into ſeven days, during which the ancients celebrated their nuptials.

CANTIMAROUS, or CATIMAROUS, a kind of raft made of three or four hollowed trunks of trees, tied together with ropes of cocoa, with a triangular ſail in the middle made of mats. They are uſed by the inhabitants of the coaſt of Coromandel, to go a fiſhing, and to trade along the coaſt.

CANTO, in muſic, the treble, or at leaſt the higher part of a piece.

This word more properly ſignifies the firſt treble, unleſs the word *ſecondo*, for the ſecond, or *ripieno*, for the treble of the grand chorus, be added.

CANTO-CONCERTANTE, is the treble of any principal part in a concerto, and generally plays or ſings throughout.

CANTONED, in architecture, is when the corner of a building is adorned with a pilaſter, an angular column, ruſtic quoins, or any thing that projects beyond the naked of a wall.

CANTONED, or CANTONIZED, *Cantoné*, in heraldry, the poſition of ſuch things as are borne with a croſs, &c. between. He bears gules, a croſs argent cantoned with four ſcallop-ſhells.

CANTONING, in the military art, is the allotting diſtinct and ſeparate quarters to each regiment of an army; the town, where they are quartered, being divided into ſo many cantons, or diviſions, as there are regiments.

CANTRED, or CANTREF, ſignifies an hundred villages, being a Britiſh word, compounded of the adjective *cant*, that is, hundred, and *tref*, a town or village. In Wales ſome of the counties are divided into cantreds, as in England into hundreds.

CANT-TIMBERS, in ſhip-building, thoſe timbers or ribs of the ſhip which are ſituated afore and abaft, or at the two ends where the ſhip grows narrower below: they are ſhaped ſomething like the back of an S, with a double curve, and the upper part of their planes decline from the planes of the other timbers, (called ſquare timbers) towards the ſtem or ſtern.

CANVAS, in commerce, a very clear unbleached cloth of hemp, or flax, wove very regularly in little ſquares. It is uſed for working tapeſtry with the needle, by paſſing the threads of gold, ſilver, ſilk, or wool, thro' the intervals or ſquares.

CANVAS is alſo a coarſe cloth of hemp, unbleached, ſomewhat clear, which ſerves to cover womens ſtays, alſo to ſtiffen mens cloaths, and to make ſome other of their wearing apparel, &c.

CANVAS is alſo a very coarſe cloth made of hemp, unbleached, ſerving to make towels, and anſwering other domeſtic purpoſes. It is alſo uſed to make ſails for ſhipping, &c.

CANZONE, in muſic, ſignifies, in general, a ſong where ſome little figures are introduced: but it is ſometimes uſed for a ſort of Italian poem, uſually pretty long, to which muſic may be compoſed in the ſtyle of a cantata. If this term be added to a piece of inſtrumental muſic, it ſignifies much the ſame as cantata: if placed in any part of a ſonata, it implies the ſame meaning as allegro, and only denotes that the part to which it is prefixed, is to be played or ſung in a briſk and lively manner.

CANZONETTA, a diminutive of canzone, denoting a little ſhort ſong: the canzonette Neapolitane have two ſtrains, each whereof is ſung twice over, as the vaudevilles of the French: the canzonette Siciliane are a ſpecies of jigg, the meaſure whereof is uſually twelve eights, and ſix eights, and ſometimes both are rondeaus.

CAP, a part of dreſs made to cover the head, and much in the figure thereof.

Cap *of Maintenance*, one of the regalia, or ornaments of ſtate belonging to the kings of England, before whom it was carried at the coronation, and other great ſolemnities. Caps of maintenance are alſo carried before the mayors of the ſeveral cities in England.

Cap *of a Gun*, a piece of lead which is put over the touch-hole of a gun, to keep the priming from being waſted or ſpoiled.

Caps, in naval affairs, ſtrong thick pieces of oak, of an oblong figure, with two holes in them, ſo fitted that the headmoſt or aftmoſt hole is bolted cloſe down on the lower maſt-head, and the foremoſt is for keeping the top-maſt ſteady, which ſlides up and down through it; and ſo of the top-gallant maſt. *Shipwreck*, p. 52. *in the Notes*. See Mast.

CAPACITY, in a general ſenſe, an aptitude, or diſpoſition to retain or hold any thing.

Capacity, in geometry, is the ſolid contents of any body; alſo our hollow meaſures for wine, beer, corn, ſalt, &c. are called meaſures of capacity.

Capacity, in law, the ability of a man, or body politic, to give or take lands, or other things, or ſue actions.

Our law allows the king two capacities, a natural and a political; in the firſt, he may purchaſe lands to him and his heirs; in the latter, to him and his ſucceſſors. The clergy have the like.

CAPARASON, or Horse-Cloth, a ſort of cover for a horſe. For led horſes, it is commonly made of linen cloth, bordered round with woolen, and enriched with the arms of the maſter upon the middle, which covers the croupe, and with two cyphers on the two ſides. The caparaſons for the army, are ſometimes a great bear's ſkin; and thoſe for ſtables, are of ſingle buckram in ſummer, and of cloth in the winter.

CAPAX, in the order of Malta, a name given to the knights that have reſided five years at Malta, have made four caravans, or ſea-campaigns, and are in a condition of coming to a command.

CAPE, in law, a judicial writ concerning plea of lands or tenements, and is divided into cape *magnum* and cape *parvum*, both of which affect things immoveable; and beſides theſe, there is a cape *ad valenciam*.

Cape *Magnum*, or the grand cape, lies before appearance, to ſummon a tenant to anſwer the default, and alſo aver to the demandant.

The Cape *Parvum* is after appearance and view granted, and it ſummoneth the tenant to anſwer the default only.

Cape *Magnum* is deſigned to lie where a perſon has brought a *præcipe quod reddat* of a thing, that touches a plea of land, and the tenant makes default at the day given to him in the original writ; then this writ ſhall go for the king, to take the land into his hands: and if he comes not at the day given him, he loſes his land, &c.

Cape *Parvum*, called petit-cape, is defined thus. When the tenant is ſummoned in plea of land, and cometh at the ſummons, and his appearance is recorded; and after he maketh default at the day that is given to him, then this writ ſhall go for the king.

Cape *ad Valenciam* is a ſpecies of cape *magnum*, where one being impleaded, and on a ſummons to warrant lands, a vouchee does not come at the day; whereupon, if the demandant recovers of the tenant, he ſhall have this writ againſt the vouchee, and recover ſo much in value of his lands, in caſe he hath ſo much; and if not, there ſhall be an execution of ſuch lands and tenements as ſhall after deſcend to him in fee; or if he purchaſes afterwards, there may be a reſummons, &c. againſt him.

CAPELET, a diſeaſe in horſes, when the tip of the hock is moveable, and more ſwelled than ordinary.

CAPELLA, in aſtronomy, a bright fixed ſtar in the left ſhoulder of the conſtellation auriga. It is, in the Britannic catalogue, the fourteenth in order of that conſtellation: and its longitude is 17°. 27′. 31″. of Gemini, and its latitude 22°. 51′. 47″. N.

CAPER, *Capparis*, in botany, a genus of plants, the corolla of which conſiſts of four roundiſh, emarginated, open petals: the fruit is a carnoſe, turbinated capſule, with only one cell, containing numerous kidney-ſhaped ſeeds.

The buds of this plant make a conſiderable article in commerce; they are imported from Italy and France in pickle, and uſed in ſauces, &c.

The caper-bark of the ſhops is not the bark of the branches, but that of the roots of the ſhrub which produces it.

It is an aperient and attenuant, and is recommended in nephritic caſes, and in dropſies, jaundices, and many other chronic diſeaſes: but the preſent practice does not pay any regard to it.

CAPHAR, a duty which the Turks raiſe on the Chriſtians, who carry or ſend merchandizes from Aleppo to Jeruſalem, and other places in Syria.

This duty of caphar was firſt impoſed by the Chriſtians themſelves, when they were in poſſeſſion of the Holy-Land, for the maintenance of the troops which were planted in difficult paſſes to obſerve the Arabs, and prevent their incurſions. It is ſtill continued, and much increaſed by the Turks, under pretence of defending the Chriſtians againſt the Arabs, with whom nevertheleſs they keep a ſecret intelligence, favouring their excurſions and plunders.

CAPI-AGA, or Capou-Agassi, a Turkiſh officer, who is, as it were, grand-maſter of the ſeraglio.

He is the firſt in dignity and repute of all the white eunuchs, and is always near the grand ſeignior's perſon. It is he who introduces ambaſſadors to audience; and all great affairs paſs through his hands before they come to that of the prince.

CAPIAS, in law, a writ of two ſorts, one before judgment in an action, and the other after: that before judgment is called *capias ad reſpondendum*, where an original is ſued out, &c. to take the defendant, and make him anſwer the plaintiff; and that after judgment is the *capias ad ſatisfaciendum*, *&c.*

Capias Ad Satisfaciendum is a writ of execution that iſſues on a judgment obtained, and lies where any perſon recovers in a perſonal action, as for debt, damages, &c. in which caſes this writ iſſues to the ſheriff, commanding him to take the body of him againſt whom the debt is recovered, who is to be kept in priſon till he make ſatisfaction.

Capias Conductos Ad Proficiscendum, an original writ which lies, by the common law, againſt any ſoldier who has covenanted to ſerve the king in war, and appears not at the time and place appointed. It is directed to two of the king's ſerjeants at arms, to arreſt and take him wherever he can be found, and to bring him *coram conſilio noſtro*, with a clauſe of aſſiſtance.

Capias Pro Fine is a writ lying where a perſon is fined to the king, for ſome offence committed againſt a ſtatute, and he does not diſcharge the fine according to the judgment; therefore his body ſhall be taken by this writ, and committed to gaol till the fine is paid.

Capias Utlegatum, a writ which lies againſt any one outlawed, upon any action perſonal or criminal, by which the ſheriff is ordered to apprehend the party outlawed, for not appearing on the exigent, and keep him in ſafe cuſtody till the day of return, when he is to preſent him to the court, to be there farther ordered for his contempt.

CAPIAS IN WITHERNAM, a writ that lies for cattle *in Withernam*; that is, where a diſtreſs taken is driven out of the county; ſo that the ſheriff cannot make deliverance upon a replevin; then this writ iſſues, commanding the ſheriff to take as many beaſts of the diſtrainer.

CAPIGI, in the Turkiſh affairs, the name of certain inferior officers belonging to the ſeraglio, to the number of five hundred, whoſe buſineſs it is to aſſiſt the janizaries in guarding the firſt and ſecond gate of that palace; whence alſo the name capigi, which ſignifies a gate.

CAPILLAMENT, in a general ſenſe, ſignifies a hair, whence the word is applied to ſeveral things, which, on account of their length or their fineneſs, reſemble hairs: as,

CAPILLAMENTS *of the Nerves*, in anatomy, the fine fibres, or filaments, whereof the nerves are compoſed.

CAPILLAMENTS, in botany, thoſe ſmall threads or hairs which grow up in the middle of a flower, and are adorned with little knobs at the top: thoſe knobs are called the apices, or antheræ, of a flower; and the capillaments are called the ſtamina. See the article STAMINA.

CAPILLARY, in a general ſenſe, an appellation given to things on account of their extreme fineneſs, or reſembling hair.

CAPILLARY FRACTURE, a ſmall and almoſt inſenſible fracture of the ſkull. See FRACTURE.

CAPILLARY ORES, in minerology, the ſame with thoſe otherwiſe denominated arboreſcent, or ſtriated.

CAPILLARY PLANTS are ſuch plants as have no main ſtem, but their leaves ariſe from the root, upon pedicles, and produce their ſeeds on the back of their leaves, as the fern, maiden-hair, &c.

Theſe plants are either with an undivided leaf, as the hemionitis and the phyllis; or with a ſingly divided leaf, which laſt have the leaf either cut or jagged in, but not divided into pinnæ, clear home to the main rib, as polypodium, lonchitis, ſcolopendria, &c. or elſe the leaf divided quite home to the rib, and hanging like pinnæ, as the chamæfelix marina and the trichomanes: others have the leaf doubly divided, or at leaſt once ſubdivided, the firſt diviſion being into branches, and the ſecond into pinnæ, as the hemionitis multifida, &c. others have the leaf trebly divided, or thrice ſubdivided, viz. firſt into branches, then into little twigs, and after this into pinnæ; and theſe are the filix ſcandens of Braſil, the filix florida, the filix mas ramoſa, &c.

CAPILLARY TUBES, in philoſophy, are ſmall pipes of glaſs, whoſe canals are extremely narrow, their diameter being only a half, a third, or a fourth of a line.

The aſcent of water, &c. in capillary tubes, is a phænomenon that has long embarraſſed the philoſophers: for let one end of a glaſs tube open at both extremities, be immerged in water, the liquor within the tube will riſe to a conſiderable height above the external ſurface: or if two or more tubes are immerged in the ſame fluid, one a capillary tube, and the other of a larger bore, the fluid will aſcend higher in the former than in the latter; and this will be in a reciprocal ratio of the diameters of the tubes.

In order to account for this phænomenon, it will be neceſſary firſt to premiſe, that the attraction between the particles of glaſs and water is greater than the attraction between the particles of water themſelves: for if a glaſs tube be placed in a poſition parallel to the horizon, and a drop of water be applied to the under ſide of the tube, it will adhere to it; nor will it fall from the glaſs till its bulk and gravity are ſo far increaſed, as to overcome the attraction of the glaſs. Hence it is eaſy to conceive how ſenſibly ſuch a power muſt act on the ſurface of a fluid, not viſcid, as water, contained within the ſmall cavity or bore of a glaſs-tube; as alſo that it will be proportionably ſtronger as the diameter of the bore is ſmaller; for it will be evident that the efficacy of the power is in the inverſe proportion of the diameter, when it is conſidered, that ſuch particles only as are in contact with the fluid, and thoſe immediately above the ſurface, can affect it.

Now theſe particles form a periphery contiguous to the ſurface, the upper part of which attracts and raiſes the ſurface, while the lower part, which is in contact with it, ſupports it; ſo that neither the thickneſs nor length of the tube is of any conſequence here; the periphery of particles only, which is always proportionable to the diameter of the bore, is the only acting power. The quantity of the fluid raiſed will therefore be as the ſurface of the bore which it fills, that is, as the diameter; for otherwiſe the effect would not be proportional to the cauſe, ſince the quantities are always as the ratio of the diameters; the heights therefore to which fluids will riſe, in different tubes, will be inverſely as the diameters.

CAPILLARY *Veſſels*, in anatomy, are the ſmalleſt or extreme parts of the veins and arteries.

CAPILLITIUM *Veneris*, in philoſophy, the fine threads often ſeen floating in the air during the autumn. See AIR-THREADS.

CAPILLUS *Veneris*, in botany, the ſame with adianthum or maiden-hair. See ADIANTHUM.

CAPISTRUM, in ſurgery, the name of a bandage uſed in caſe of fractures of the jaw.

CAPITAL, in a general ſenſe, implies the head, chief, or principal of a thing.

The word is formed from the Latin, *caput*, the head, ſource, or beginning.

CAPITAL, in geography, denotes the principal city of a kingdom, province, or ſtate. See METROPOLIS.

CAPITAL, among merchants, &c. implies the ſum of money which individuals advance to make up the common ſtock of a partnerſhip when it is firſt formed. It is alſo uſed to ſignify the ſtock with which a merchant firſt begins trade on his own account. It likewiſe denotes the fund or ſtock of a trading company or corporation.

CAPITAL *Crime* implies a crime which ſubjects the criminal to a capital puniſhment, or loſs of life.

CAPITAL, in architecture, is the uppermoſt part of a column or pilaſter, ſerving as the head or crowning, placed immediately over the ſhaft, and under the entablature.

The capital is the principal and eſſential part of an order of a column or pilaſter, and is of a different form in different orders, becoming the diſtinguiſhing characteriſtic between them. Vitruvius tells us that Callimachus, an ingenious ſtatuary of Athens, invented the firſt regular capital from the following accident. An Athenian old woman happening to place a baſket covered with a ſquare tile over the root of an acanthus, which grew on the grave of a young Corinthian lady, the plant ſhooting up the following ſpring, encompaſſed the baſket all round, till meeting with the tile it curled back in a kind of ſcrolls. The above ſculptor paſſing by, and obſerving it, executed a capital on this plan, repreſenting the tile by the abacus, the leaves of the acanthus by the ſcrolls, and the baſket by the body of the capital.

The Tuſcan **CAPITAL** is the moſt ſimple and unadorned of all the reſt; its members or parts are four only, viz. an abacus *a*; (plate XXXIII. *fig.* 1.) an ovolo or quarter round *b*; a collarino or neck *c*; and an aſtragal *d*; the latter indeed properly belongs to the fuſt or ſhaft.

The character which diſtinguiſhes this capital from the Doric, &c. is, that the abacus is ſquare and quite plain, having no ogee or other moulding; and that there are no annulets under the ovolo. Authors indeed vary a little with regard to the character of the Tuſcan capital.

Vignola, for inſtance, gives the abacus a fillet inſtead of an ovolo: Vitruvius and Scamozzi add an aſtragal and fillet between the ovolo and neck: Serlio only a fillet; and Philander rounds the corners of the abacus.

In the Trajan column there is no neck, the aſtragal of the ſhaft being confounded with that of the capital.

The height of this capital is the ſame with that of the baſe, viz. one module, or ſemidiameter. Its projecture is equal to that of the bottom of the column, viz. five eighths of the module.

The Doric **CAPITAL** has three annulets, or little ſquare members, underneath the ovolo, inſtead of the aſtragal in the Tuſcan, beſides the abacus, an ovolo and a neck, all which it has in common with the former; and a talon, cyma, or ogee, with a fillet over the abacus. See plate XXXIII. *fig.* 2.

Authors are alſo divided with regard to the characters of this capital. Palladio, Vignola, &c. put roſes under

the

Fig. 1. Tuscan Capital.

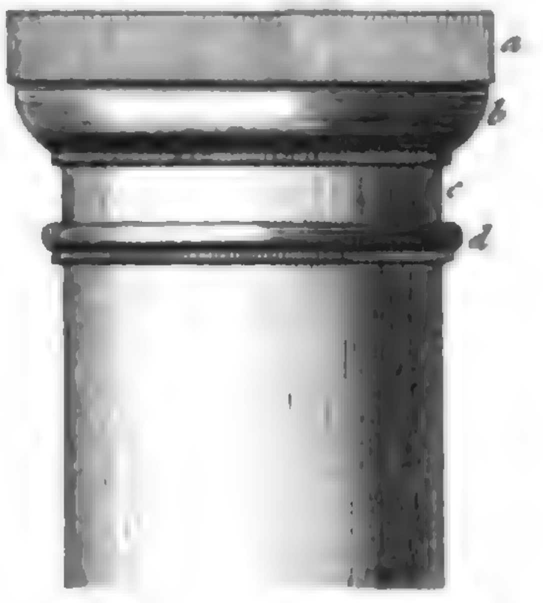


Fig. 2. Doric Capital.

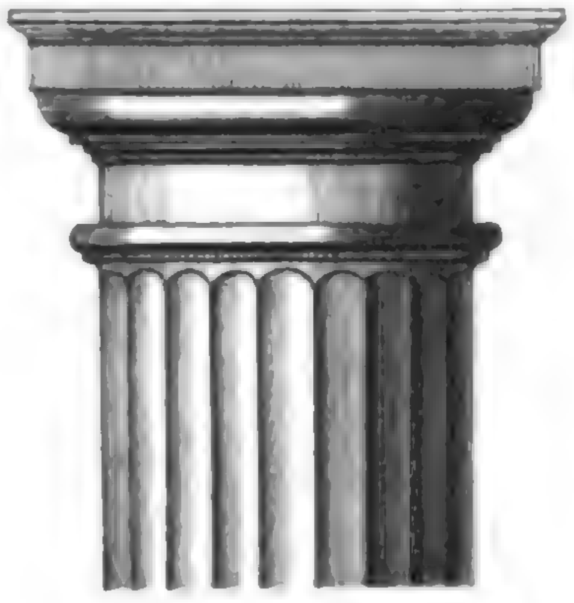


Fig. 3. Ancient Ionic Capital

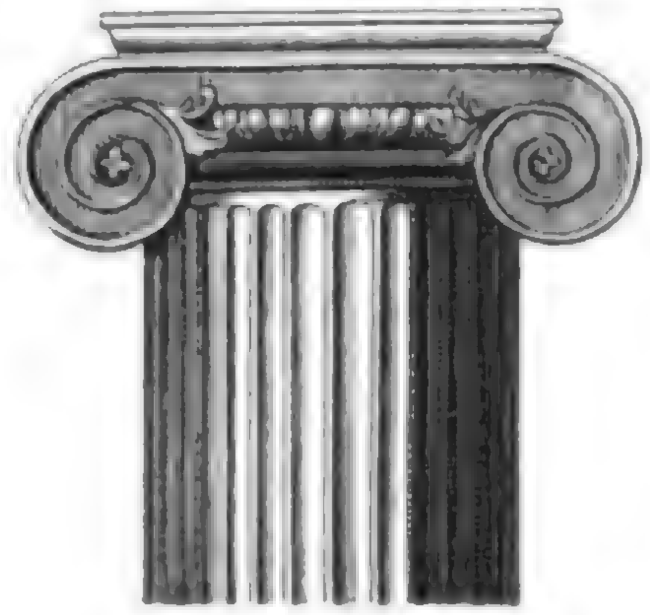


Fig. 4. Modern Ionic Capital

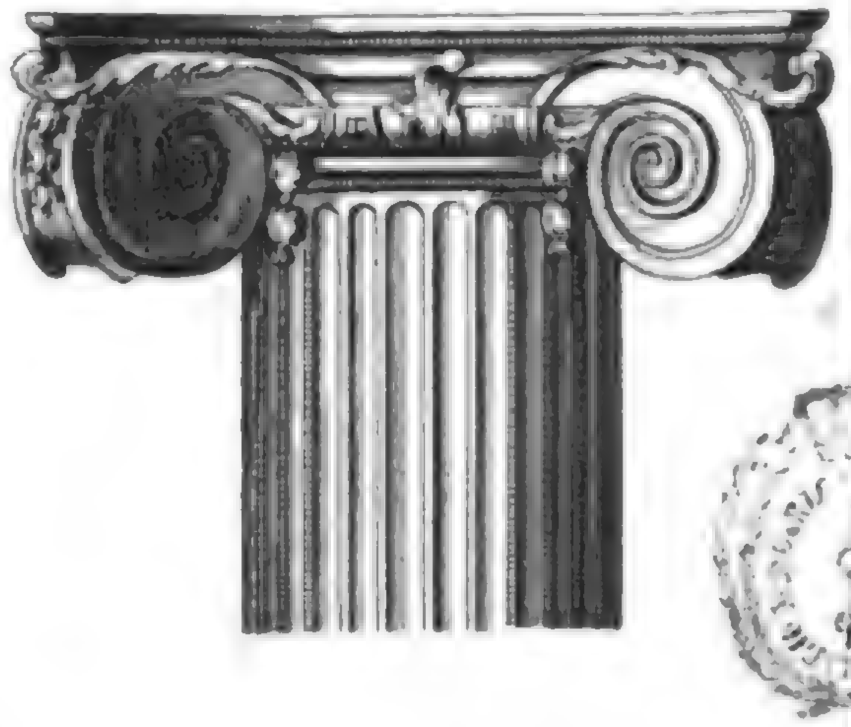


Fig. 5. Corinthian Capital.

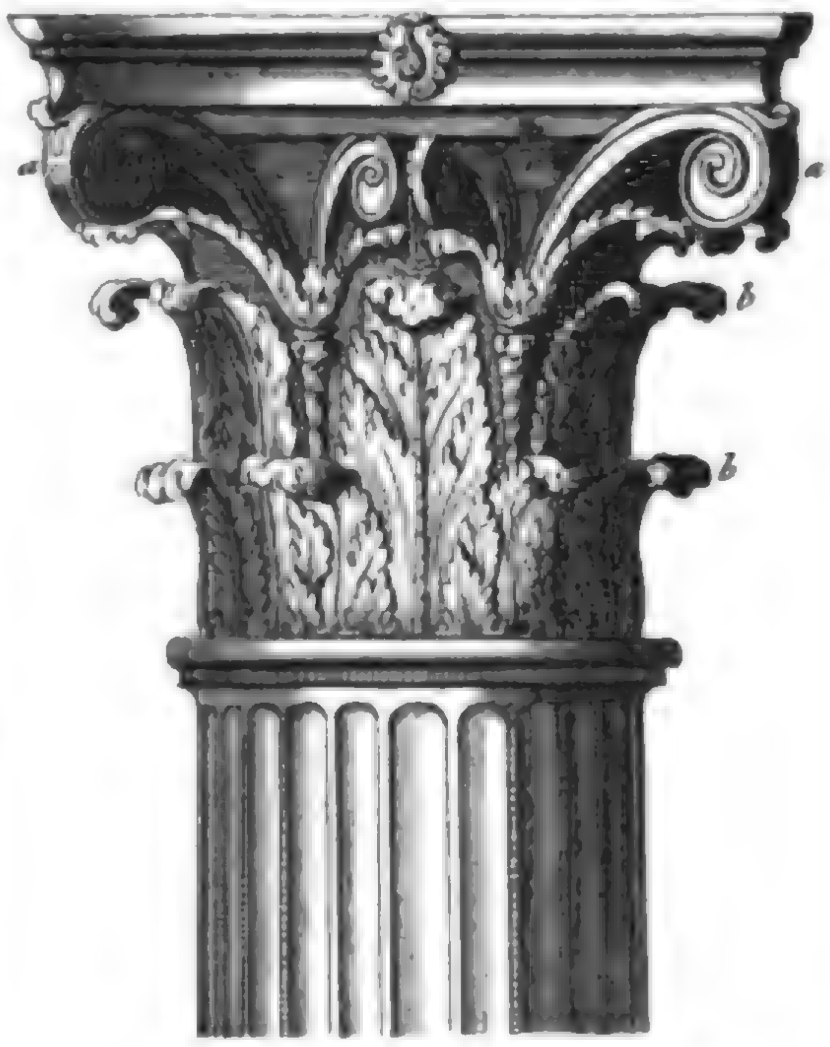
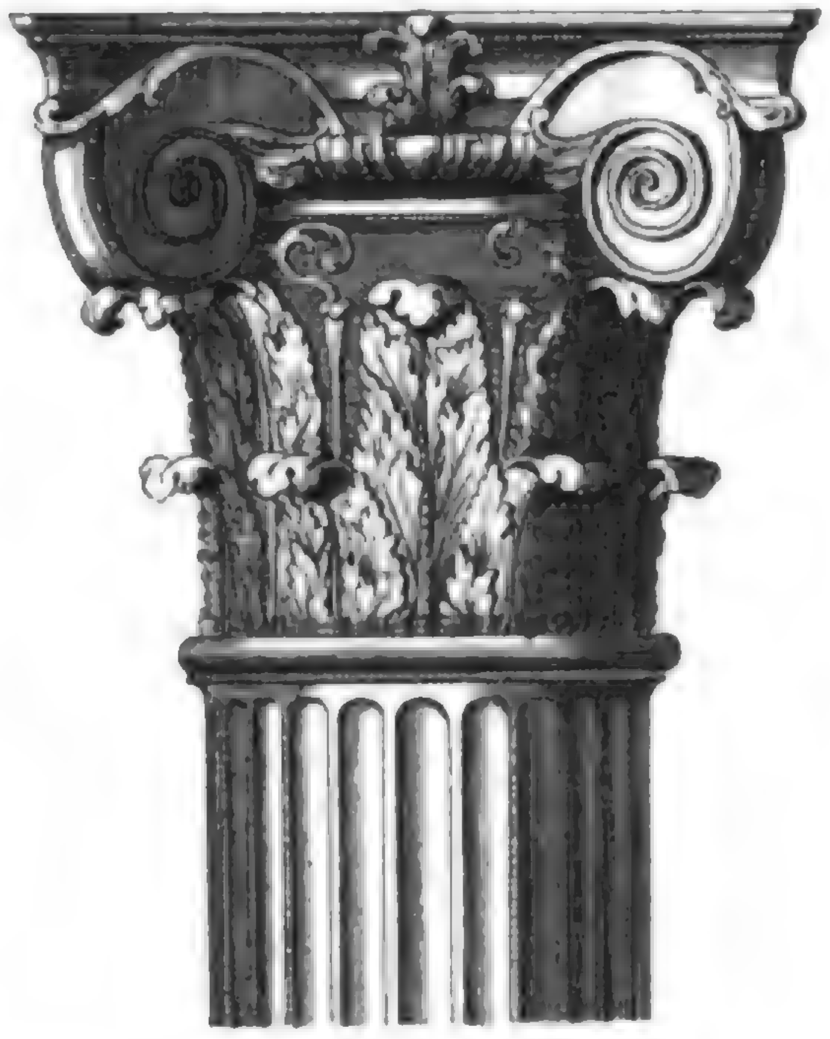


Fig. 6. Composite Capital.



Modules or 24 Minutes.

1 2

the corners of the abacus, and alſo on the neck of this capital.

Vitruvius makes the height of this capital equal to half the diameter of the column below; and this height being divided into three parts, the firſt goes to the neck, the ſecond to the boultin, and the third to the uppermoſt part of the capital.

The Ionic CAPITAL is compoſed of three parts; an abacus, conſiſting of an ogee; under this a rind, which produces the volutes or ſcrolls, the moſt eſſential parts of this capital; and at the bottom an ovolo or quarter round. The aſtragal under the ovolo belongs to the ſhaft: the middle part is called the rind or bark, from its ſuppoſed reſemblance to the bark of a tree, laid on a vaſe, whoſe brim is repreſented by the ovolo, and ſeeming to have been ſhrunk up in drying, and to have been twiſted into the volutes. The ovolo is adorned with eggs, as they are ſometimes called from their oval form. See plate XXXIII. *fig.* 3.

The height of this capital, according to M. Perrault, is eighteen minutes, and its projecture one module ſeven tenths.

The differences in the character of this capital flow chiefly from the different management of the volutes, and conſiſt in the following particulars: 1. That in the antique and ſome of the modern, the eye of the volute does not anſwer the aſtragal of the top of the ſhaft, as Vitruvius and ſome of the moderns make it. 2. That the face of the volutes, which uſually makes a flat, is ſometimes curved and convexed, ſo that the circumvolutions go advancing outwards, as is frequent in the antique. 3. That the border, or rim of the ſcroll in the volute, is ſometimes not only a plain ſweep, but the ſweep is accompanied with a fillet. 4. That the leaves which inveſt the balluſter are ſometimes long and narrow, ſometimes larger and broader. 5. That the two faces of the volutes are ſometimes joined at the outward corner, the balluſters meeting in the middle, to form a regularity between the faces on the front and back of the building, with thoſe of the ſides. 6. That among the moderns, ſince Scamozzi, the Ionic capital has been altered, and the four faces made alike, by taking away the balluſter, and hollowing all the faces of the volutes inwards, like the Compoſite capital. 7. That Scamozzi and ſome others make the volutes to ſpring out of the ovolo, as from a baſe; whereas in the antique the bark paſſes between the ovolo and abacus quite ſtraight, only twiſting at its extremities to form the volute. And laſtly, that of late the ſculptors have added a kind of ſmall feſtoons, which ſpring from the flower, whoſe ſtalk lies on the circumvolution of the volute. See *fig.* 4.

The Corinthian CAPITAL is the richeſt of all the orders, and imputed to Callimachus, an Athenian ſtatuary, as we have already obſerved. It is adorned with eight volutes *a*, (plate XXXIII. *fig.* 5.) a double row of leaves *b*, and eight ſcrolls *c*, ſituated round a body called, by ſome, campana or bell, and by others tambour or drum.

The height of this capital is two modules and one third, and its projecture one module and one third.

The differences in the characters of this capital are; 1. That in Vitruvius and others, the leaves are thoſe of the acanthus; whereas in the antique they are uſually thoſe of the olive tree. 2. That the leaves are commonly unequal, the lower being made the taller; though ſometimes all equal; nor are there inſtances wanting where the lower leaves are the ſhorter. 3. The leaves are ſometimes ruffled, ſometimes quite plane; the firſt row generally bellies out towards the bottom, but at other times they are ſtraight. 4. Sometimes the horns of the abacus are ſharp at the corner, but moſt commonly the corners are cut off. 5. There is ſome difference in the form and ſize of the roſe. 6. The volutes are ſometimes joined to each other, and ſometimes wholly ſeparated. 7. Sometimes the ſpires of the volutes continue twiſting even to the end, in the ſame courſe; and ſometimes they are turned back again near to the center, in the form of the letter S.

The Compoſite CAPITAL is an invention of the Romans, and is compoſed of the double row of leaves in the Corinthian, and the volutes in the Ionic. See plate XXXIII. *fig.* 6.

The height of this capital is two modules and one third, and the projecture one module and two thirds.

The differences of its character conſiſt of the following particulars. 1. That the volutes which generally deſcend and touch the leaves, are in ſome works of the antique ſeparated from them. 2. That the leaves are ſometimes unequal in height, the lower row being the taller; and ſometimes both are equal. 3. That the volutes of the moderns generally ſpring out of the baſe; whereas in the antique they run ſtraight the whole length of the abacus, over the ovolo, without ſtriking into the vaſe. 4. That the volutes, whoſe thickneſs is contracted in the middle, and enlarged both above and below in the antique, have their ſides parallel in the works of the moderns. 5. That the volutes, which have generally been made as if ſolid both by the ancients and moderns, are now made much lighter and more airy; the folds ſtanding hollow, and at a diſtance from one another.

Attic CAPITAL, that which has leaves of partition in the gorge.

Angular CAPITAL, that which ſupports the return of an entablature, at the corner of the projecture of a frontiſpiece.

CAPITAL *of a Balluſter*, that part which crowns a balluſter, reſembling ſometimes the capital of ſome order, generally the Ionic.

CAPITAL *of a Trigliph*, the plat-band over the trigliph, called by Vitruvius tænia. It is ſometimes a trigliph, and performs the office of a capital to the Doric pilaſter.

CAPITAL *of a Nich*, a kind of ſmall canopy made over a ſhallow nich, to cover a ſtatue.

CAPITAL *of a Lantern*, a covering, ſometimes of one form, and ſometimes of another, which finiſhes the lantern of a dome.

CAPITAL *of a Baſtion* implies a line drawn from the point of the baſtion to the angle of the polygon; or from the point of the baſtion to the middle of the gorge.

CAPITALS, among printers, large or initial letters, with which all periods, verſes, &c. commence.

CAPITATED PLANTS, *Capitatæ Plantæ*, in botany, a name given by Mr. Ray to thoſe plants, whoſe ſeed, together with their down, being included in a ſcaly calyx, are conglomerated into a roundiſh figure like a head. Carduus, centaury, cinara, &c. are of this kind.

CAPITATION, a tax or impoſition raiſed on each perſon in conſideration of his labour, induſtry, office, rank, &c.

CAPITE, in law, an ancient tenure of land, held immediately of the king, as of his crown, either by knight's ſervice, or ſoccage. It is now aboliſhed.

CAPITOL, in antiquity, a celebrated caſtle erected on the ſummit of the Mons Capitolinus at Rome, and contained a temple dedicated to Jupiter, in which the ſenate formerly aſſembled. The nave of this ſtructure was ſacred to Jupiter, one of the wings to Juno, and the other to Minerva. In this beautiful edifice, which was richly adorned with ornaments, were contained the moſt ſacred depoſits of religion, ſuch as the ancylia, the books of the Sybils, &c.

CAPITOLINE *Games*, in antiquity, annual games inſtituted by Camillus in honour of Jupiter Capitolinus, and in commemoration of the Capitol's not being ſurpriſed by the Gauls.

There was alſo another kind of Capitoline games inſtituted by Domitian, when rewards and crowns were beſtowed on the poets, orators, hiſtorians, and muſicians. Theſe were celebrated every five years.

CAPITULA RURALIA, aſſemblies or chapters held by rural deans and parochial clergy, within the precinct of each deanry; held at firſt every three weeks, afterwards once a month, and more ſolemnly once a quarter.

CAPITULATION, in military affairs, a treaty made between the garriſon or inhabitants of a place beſieged, and the beſiegers, for delivering up the place on certain conditions expreſſed in the treaty.

CAPITULATION, in the German polity, implies a contract made by the emperor with the electors, in the name of all the princes and ſtates of the empire, before he is declared emperor, and which he ratifies before he is raiſed to the Imperial dignity.

CAPITULUM, among botaniſts, the ſame with what is otherwiſe called umbel. See UMBEL.

CAPIVI, or COPAIBA. See BALSAM *of Copaiba.*

CAPOC, a ſort of cotton as ſoft as ſilk, but ſo fine and ſhort that it cannot be ſpun. It grows in the Eaſt-Indies, and alſo near the river Guaiaquil in South-America; where it is uſed to fill beds, &c.

CAPON, a cock chicken, gelded as ſoon as left by the hen, or at leaſt as ſoon as he begins to crow.

CAPON'S TAIL-GRASS, the ſame with feſtuca. See FESTUCA.

CAPONIERE, or CAPONNIERE, in fortification, a work ſunk about four or five feet deep, on the glacis of a place; the earth that is thrown out of it ſerves to form a parapet of two or three feet high, furniſhed with loop-holes, or ſmall embraſures; it is covered over head with ſtrong planks, on which are laid clays, or hurdles, to ſupport the earth with which the whole is covered. It will contain about fifteen or twenty men, who fire through the loop-holes upon the beſiegers. Caponieres are ſometimes made in the bottom of a dry moat.

CAPPADINE, a ſort of ſilk flock taken from the upper part of the cocoon, after the ſilk is wound off.

CAPPARIS, caper, in botany; ſee CAPER.

CAPRA, the goat, in zoology; ſee GOAT.

CAPRA-SALTANS, in meteorology, a fiery meteor or exhalation, ſometimes ſeen in the atmoſphere. It forms an inflected line, reſembling in ſome meaſure the caperings of a goat; whence it has its name.

CAPRARIA, in botany, a genus of plants, the flower of which conſiſts of a ſingle concave petal, divided into four ſegments: the fruit is an oblong conic capſule, formed of two valves, and containing only one cell, where there are a great number of oblong ſeeds.

CAPREA, or CAPREOLUS, the roe-deer, in natural hiſtory, an animal of the deer-kind, with rounded, erect, and ramoſe horns.

CAPRICORN, in aſtronomy, one of the twelve ſigns of the zodiac, repreſented on globes in the form of a goat, and in aſtronomical books with the following character, ♑. See GLOBE.

It is the tenth ſign in order, and conſiſts of nineteen ſtars in the catalogues of Ptolemy and Tycho Brahe; of twenty-nine in that of Hevelius; and of fifty-one in that of Mr. Flamſtead.

Tropic of CAPRICORN, a leſſer circle of the ſphere, parallel to the equinoctial, and 23°. 29′. diſtant from it towards the ſouth-pole.

CAPRIFICATION, a method uſed in the Levant for ripening the fruit of the domeſtic fig-tree, by means of inſects bred on that of the wild fig-tree.

Writers tell us that the domeſtic fig will never attain a proper degree of ripeneſs, unleſs wounded by theſe inſects in order to depoſit their eggs.

CAPRIFOLIUM, honey-ſuckle, in botany; ſee HONEY-SUCKLE.

CAPRIMULGUS, the goat-ſucker, in ornithology; ſee HIRUNDO.

CAPRIOLES, in the menage, imply the leaps made by a horſe in the ſame place, without advancing in ſuch a manner, that when he is at the height of the leap, he jerks out his hinder legs.

CAPSICUM, guinea-pepper, in the materia medica, long, roundiſh, taper, bright red pods, divided into two or three cells full of ſmall whitiſh ſeeds; the fruit of an annual plant, with ſquare ſtalks, and white flowers growing in the boſoms divided into five ſegments in form of a ſtar. The plant is a native of the torrid zone, and raiſed in ſome of our gardens.

Capiſcum is ſometimes given, in very ſmall quantities, as one of the higheſt ſtimulants, in cold ſluggiſh phlegmatic conſtitutions, in ſome parylitic caſes, in relaxations and inſenſibility of the ſtomach, and for promoting the efficacy of aleotic medicines and the deobſtruent gums in uterine diſorders: but its principal uſe is at the table. A ſpecies of it, called, in the Weſt-Indies, bird-pepper, is the baſis of the powder brought from thence under the name of Cayan pepper. It is worth remarking, that this fruit, perhaps the ſtrongeſt of the aromatic ſtimulants, is uſed freely by the natives of the warmer climates: poſſibly theſe pungent antiſeptic kinds of ſubſtances may be more ſalubrious there than with us, as they ſeem qualified to reſiſt or correct the putredinous colliquation of the humours which immoderate heat produces.

CAPSQUARES, in gunnery, ſtrong plates of iron which come over the trunnions of a gun, and keep it in the carriage.

They are faſtened by a hinge to the prize-plate, that they may lift up and down, and form a part of an arch in the middle, to receive a third part of the thickneſs of the trunnions, two thirds being let into the carriage. The other end is faſtened with two iron wedges, called the fore-locks and keys.

CAPSTAN, or CAPSTERN, in naval affairs, a ſtrong maſſy piece of timber let down through the decks of a ſhip, and reſting its foot, or axis, which is ſhod with iron, in an iron ſocket, called a ſaucer, which is fixed on a wooden block or ſtandard, called the ſtep, reſting on the beams.

There are commonly two capſterns in a ſhip of war, the main and the jear capſterns: they are uſed to heave the anchors up to the ſhip; to draw up or let down the top-maſts or any other weighty body; or to heave any great ſtrain in a level direction, as drawing the ſhip forward or backward, &c.

A capſtern is compoſed of ſeveral parts, as the main-poſt or body; the whelps; the drum-head; the pawls, and the ſpindle: it has likewiſe ſeveral appurtenances, as the bars, the pins, and the ſwifters.

The whelps are raiſed out from the main body of the capſtern, and reach from the lower part of the drum-head to the deck all around, that it may have the greater ſweep in heaving round: the drum-head is a broad cylindrical piece of wood, ſometimes of the ſame ſtock with the reſt of the body, and ſometimes made of another, and fixed on it; in the drum-head are cut a number of ſquare holes, into which the capſtern bars are fixed, by which the men heave it round: the pawls, which are on each ſide, are ſhort pieces of iron, bolted at one end through the deck to the beams, cloſe to the body of the capſtern, and theſe being placed in the intervals of the whelps, as the capſtern turns, prevent it from recoiling, which might greatly endanger the men: the ſpindle is the axis or foot with which it reſts on, and turns in the ſaucer: the pins are little round bolts of iron, let down through the drum-head into the holes in the bars, to keep them from working out by the motion of the ſea, or ſudden jerks of the capſtern: and laſtly, the ſwifter is a rope paſſed through the outer-ends of the bars to keep the men ſteady as they walk round.

Surge the CAPSTERN is to ſlacken the rope heaved round, that it may ſlide up further on the body of the capſtern, as it would otherwiſe, by turning conſtantly, get under the whelps, and prevent the capſtern from going round.

Come up the CAPSTERN is to let go the rope entirely at which they had been heaving.

CAPSULATE, or CAPSULATED PLANTS, thoſe furniſhed with capſules for the reception of their ſeed.

CAPSULE, in a general ſenſe, implies a ſmall receptacle or coffer, in the form of a bag.

The word is formed from the Latin, *capſula*, a diminutive of *capſa*, a coffer.

CAPSULE, among botaniſts, is a kind of pericarpium or ſeed veſſel, compoſed of ſeveral elaſtic valves, which uſually burſt open at the points when the ſeed are ripe. It differs from a pod in being ſhort and roundiſh.

This kind of pericarpium ſometimes contains one cell, or cavity, and ſometimes more: in the firſt caſe it is called an unilocular capſule; in the ſecond, bilocular, trilocular, &c. as it contains two, three, &c. cells or cavities.

CAPSULA-COMMUNIS, in anatomy, is a tunic continuous with the peritonæum, and includes the branches of the vena porta and biliary ducts, both as they approach the liver and within it.

CAPSULA-CORDIS. See PERICARDIUM.

CAPSULÆ ATRABILIARIÆ, called alſo *glandulæ renales*, and *renes ſuccenturiati*, are two yellowiſh glands of a compreſſed figure, lying on each ſide of the upper part of the kidneys. They have a very narrow cavity, imbued with a browniſh liquor of a ſweetiſh taſte. Their figure is irregular, between ſquare, triangular, and oval. Their ſize alſo is various; but in adults, they are in general about the bigneſs of a large nux vomica. In the fœtus they are larger, and often exceed the kidneys themſelves in ſize. The membrane that ſurrounds them is very thin; it cloſely involves their whole ſubſtance, and connects them with the kidneys. Their blood veſſels are ſometimes ſent from the aorta and the vena cava, but more frequently from the emulgents: their nerves are from the plexus renalis, and their lymphatic veſſels are numerous. There is no excretory duct diſcovered in them; and their uſe is therefore not certainly known. By their great ſize in the fœtus, they ſeem deſtined rather to the ſervice of that ſtate than of any other.

CAPSULÆ-SEMINALES, the ſame with veſiculæ-ſeminales. See VESICULÆ, &c.

CAPTAIN, a military officer, whereof there are various kinds, according to their commands.

CAPTAIN *of a Troop or Company*, an inferior officer, who commands a troop of horſe or company of foot, under a colonel. In the ſame ſenſe, we ſay, captain of dragoons, of grenadiers, of marines, of invalids, &c.

In the horſe and foot guards, the captains have the rank of colonels.

CAPTAIN *General*, he who commands in chief.

CAPTAIN *Lieutenant*, he who with the rank of captain, but the pay of lieutenant, commands a troop or company in the name and place of ſome other perſon who is diſpenſed with on account of his quality from performing the functions of his poſt.

Thus the colonel, being uſually captain of the firſt company of his regiment; that company is commanded by his deputy, under the title of captain-lieutenant.

So in England, as well as in France, the king, queen, dauphin, princes, &c. have uſually the title of captains of the guards, gens d'armes, &c. the real duty of which offices is performed by captain-lieutenants.

CAPTAIN *Reformed*, one who, upon the reduction of the forces, has his commiſſion and company ſuppreſſed; yet is continued captain, either as ſecond to another, or without any poſt or command at all.

CAPTAIN *of Militia*, he who commands a company of the militia, or trained bands. See the article MILITIA.

CAPTAIN BASHAW, or CAPONDAN BASHAW, in the polity of the Turks, ſignifies the Turkiſh high-admiral. He poſſeſſes the third office of the empire, and is inveſted with the ſame power at ſea, that the vizier has on ſhore. Solyman II. inſtituted this office in favour of the famous Barbaroſſa, with abſolute authority over the offices of the marine and arſenal, whom he may puniſh, caſhier, or put to death, as ſoon as he is without the Dardanelles. He commands in chief in all the maritime countries, cities, caſtles, &c. and, at Conſtantinople, is the firſt magiſtrate of police in the villages on the ſide of the Porte, and the canal of the Black-ſea. The mark of his authority is a large Indian cane, which he carries in his hand, both in the arſenal and with the army.

The captain-baſhaw enjoys two ſorts of revenues; the one fixed, the other caſual. The firſt ariſe from a capitation of the iſlands in the Archipelago, and certain governments in Natolia and Galipoli. The latter conſiſt in the pay of the men who die during a campaign; in a fifth of all prizes made by the begs; in the profits accruing from the labour of the ſlaves, whom he hires as rowers to the grand ſeignior; and in the contributions he exacts in all places where he paſſes.

CAPTAIN *of a Ship of War*, the officer who commands a ſhip of the line of battle, or a frigate bearing twenty guns or above. This officer ranks with a colonel in the army.

The officers who command ſloops of war, bomb-ketches, fire-ſhips, or armed-ſhips, are only called commanders; and theſe rank with majors in the army.

The charge of a captain or commander of one of his majeſty's ſhips of war is very great and complicated, ſeeing he is not only anſwerable for any bad conduct in the navigation, fighting, or equipping her, but alſo for the ill management of his inferior officers, whoſe particular charges he is commiſſioned to ſuperintend and controul.

When he is acquainted with the condition of the ſhip he is appointed to command, he is ordered to attend her conſtantly, and haſten the preparations neceſſary to fit her for ſea; and ſo ſtrict are the injunctions laid on him in theſe caſes, that he is forbid to lie out of the ſhip from the day of his coming aboard, till the day of his diſcharge, unleſs by particular leave from the admiralty or his commander in chief.

He is commanded to ſurvey all the military ſtores that are ſent aboard, and to return thoſe that are unfit for uſe; to uſe his utmoſt application to get manned; and to obſerve that none of his men are unable for ſervice; that the government may be put to as little unneceſſary expence as poſſible, and to keep the eſtabliſhed number of men complete; to muſter them himſelf once a week if there be no clerk of cheque (ſee that article) or muſter-maſter; to obſerve that no ſtores are miſapplied or converted to private uſes; to order ſuch ſtores as ſhall require to be brought on deck and aired as often as convenient; to order that all fire and candles be put out at night on ſetting the watch, and that no tobacco be ſmoked but in a place appointed for that purpoſe; to carry no woman to ſea, nor requeſt any foreigner to ſerve in his ſhip, who are officers or gentlemen, without orders from the admiralty; to give timely notice to any merchant-ſhips bound his way, when going to ſea, and take them under his care and protection, as alſo ſuch other as he may meet with in his paſſage, as far as his way and theirs lye together; to keep a journal from the time of his going to ſea, till his arrival in any port; and when he arrives there, to be very careful in the choice of anchor-ground (ſee ANCHOR-GROUND): at this time he is to aſſemble his officers, and draw up a detail of the obſervations that have been made during the voyage; of the qualities of the ſhip, as to her trim, ballaſt, ſtowage, and manner of ſailing, for the information and direction of thoſe who may command her afterwards: and this account is to be ſigned by himſelf and officers, and to be returned to the commiſſioner of the navy reſiding at the port where the ſhip is diſcharged.

CAPTION, in law, is where a commiſſion is executed, and the commiſſioners ſubſcribe their names to a certificate, declaring when and where the commiſſion was executed. It relates chiefly to commiſſions, to take anſwers in chancery, and depoſitions of witneſſes, and take fines of lands, &c.

CAPTIVE, a ſlave or perſon taken by the enemy in war, or by a pirate or corſair. See the articles SLAVE and PIRATE.

CAPTIVITY, a puniſhment which God inflicted upon his people for their vices and infidelities. The firſt of theſe captivities is that of Egypt, from which Moſes delivered them; after which are reckoned ſix during the government of the judges: but the greateſt and moſt remarkable were thoſe of Judah and Iſrael, which happened under the kings of each of theſe kingdoms. It is generally believed that the ten tribes of Iſrael never came back again after their diſperſion; and Joſephus and St. Jerom are of this opinion: nevertheleſs, when we examine the writings of the prophets, we find the return of Iſrael from captivity pointed out in a manner almoſt as clear as that of the tribes of Benjamin and Judah.

The captivities of Judah are generally reckoned four; the fourth and laſt of which fell in the year of the world 3416, under Zedekiah; and from this period begin the ſeventy years captivity, foretold by Jeremiah.

Since the deſtruction of the temple by the Romans, the Hebrews boaſt, that they have always had their heads, or particular princes, whom they call princes of the captivity, in the Eaſt and Weſt. The princes of the captivity in the Eaſt governed the Jews, who dwelt at Babylon, in Chaldæa, Aſſyria, and Perſia; and the princes of the captivity in the Weſt governed thoſe who dwelt in Judæa, Egypt, Italy, and in other parts of the Roman empire. He who reſided in Judæa took up his abode commonly at Tiberias, and aſſumed the title of Roſchabboth, head of the fathers or patriarchs. He preſided in aſſemblies, decided in caſes of conſcience, levied taxes for the expences of his viſits, and had officers under him, who were diſpatched through the provinces for the execution of his orders.

As to the princes of the captivity of Babylon, or the Eaſt, we know neither the original nor ſucceſſion of them; it appears only, that they were not in being before the end of the ſecond century.

CAPTURE ſignifies particularly prizes taken by privateers, in time of war, which are to be divided between the captors. See the article Prize.

CAPUT, the head, in anatomy. See Head.

Caput Concutiens, a muſcle of the neck, otherwiſe called tranſverſarius ſecundus. See Transversarius.

Caput Draconis, the dragon's head, in aſtronomy, the aſcending node of the moon. See the article Node.

Caput Draconis is alſo a ſtar of the firſt magnitude, in the head of the conſtellation draco. See the article Draco.

Caput Gallinaginis, in anatomy, a kind of ſeptum, or ſpongeous border at the extremities of the apertures of each of the veſiculæ ſeminales, ſerving to hinder the ſeed coming from one ſide, from ruſhing upon, and ſo ſtopping the diſcharge of the other.

Some will have its uſe to be, to prevent the impulſe of the ſeed from dilating the orifices of the veſiculæ, and ſo oozing out, except when aſſiſted by the compreſſion of the ſurrounding parts, as in copulation; but this, according to others, is rather the office of a diſtinct caruncle, placed at each orifice, and acting as a valve.

Caput Mortuum, in chemiſtry, that thick, dry matter, which remains after diſtillation of any thing, but eſpecially of minerals.

The caput mortuum, called alſo terra damnata, is found in form of a friable, porous matter, without taſte or ſmell: it is ranked among the chemical elements, and ſuppoſed to conſtitute the dry, fixed, earthy, and ſolid part of all bodies whatever. It is what the chemiſts call a paſſive element or principle, ſerving as the baſis or ſupport of the active ones.

CAR, or Carr. See the article Carr.

CARABE, or Karabe, in natural hiſtory, a name given to amber. See Amber.

CARABINE, a fire-arm, ſhorter than a muſket, carrying a ball of twenty-four in the pound, borne by the light horſe, hanging at a belt over the left ſhoulder.

The barrel is two feet and a half long, and is ſometimes furrowed ſpirally within, which is ſaid to add to the range of the piece.

CARABINEERS, or Carabiniers, regiments of light horſe, carrying longer carabines than the reſt, and uſed ſometimes on foot.

CARACOL, in the menage, the half turn which a horſeman makes, either to the right or left.

In the army, the horſe always make a caracol after each diſcharge, in order to paſs to the rear of the ſquadron.

Caracol, in architecture, denotes a ſtaircaſe in a helix or ſpiral form.

CARACT, Carat, or Carrat, the name of that weight which expreſſes the degree of fineneſs that gold is of.

The mint maſter, or cuſtom, have fixed the purity of gold at twenty-four caracts; though it is not poſſible ſo to purify and refine that metal, but it will want ſtill about one fourth part of a caract in abſolute purity and perfection. The caract is divided into $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, and $\frac{1}{32}$. Theſe degrees ſerve to diſtinguiſh the greater or leſſer quantity of alloy therein contained: for inſtance, gold of twenty-two caracts is that which has two parts of ſilver, or of any other metal, and twenty-two of fine gold.

Caract is alſo a certain weight which goldſmiths and jewellers uſe wherewith to weigh precious ſtones and pearls.

This caract weighs four grains, but ſomething lighter than the grains of other weights. Each of theſe grains is ſubdivided into $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$, &c.

CARAGROUTH, in commerce, a ſilver coin of the empire, weighing nine drachms. It goes at Conſtantinople for 120 aſpers. There are four ſorts of them, which are all equally current, and of the ſame value.

CARAITES, in the eccleſiaſtical hiſtory of the Jews, a religious ſect among that people, who adhere cloſely to the text and letter of the ſcriptures, rejecting the rabbinical interpretations, and the cabbala. The Caraites paſs for the moſt learned of the Jewiſh doctors; they are chiefly to be met with in Poland, Muſcovy, and the Eaſt; they are but few in compariſon of the bulk of the Jews, who are of the party of the rabbins: the latter have ſo great an averſion for the Caraites, that they will have no alliance, nor even converſation with them: they treat them as baſtards; and if a Caraite would turn rabbiniſt the other Jews would not receive him.

CARANNA, a concrete reſinous juice, exuding from a large tree, of which we have no particular account, it is brought from New Spain and ſome other parts of America in little maſſes, rolled up in leaves of flags; externally of a dark browniſh colour, internally brown with a caſt of red, variegated with irregular white ſtreaks; ſomewhat ſoft and tenacious as it firſt comes over, but in keeping grows dry and friable.

This juice has an agreeable ſmell, eſpecially when heated, and a bitteriſh and ſlightly pungent taſte. Water diſſolves above one fourth of it, and rectified ſpirit above three fourths: what is left by the one menſtruum diſſolves in the other, a ſmall quantity of impurities excepted; both ſolutions are of a bright yellow colour, the ſpirituous deepeſt.

The watery tincture ſmells agreeably of the caranna, and is in taſte bitteriſh and ſomewhat warm. In diſtillation with water, there ſeparates from the aqueous fluid a conſiderable quantity of an orange coloured eſſential oil, of a very fragrant ſmell, and a moderately pungent taſte: the remaining decoction inſpiſſated, leaves an extract of an ungrateful, though weak bitteriſhneſs.

The ſpirituous tincture is both in ſmell and taſte ſtronger and more agreeable than the watery. Inſpiſſated, it yields a very tenacious adheſive reſin, with an oily matter which ſeparates and floats on the ſurface: the reſin has very little ſmeel, and ſcarcely makes any impreſſion on the organs of taſte; the oil is conſiderably aromatic, and moderately bitter, in which laſt reſpect it differs from the purer oil obtained by diſtillation with water.

Caranna has been chiefly employed as an ingredient in vulnerary balſams, corroborant and diſcutient plaiſters, and other external applications. It has very ſeldom been given internally, and is now, in this country, almoſt wholly in diſuſe.

CARAT, or Caract. See the article Caract.

CARAVAN, or Caravanne, in the Eaſt, ſignifies a company or aſſembly of travellers and pilgrims, and more particularly of merchants, who for their greater ſecurity, and in order to aſſiſt each other, march in a body through the deſarts, and other dangerous places, which are infeſted with Arabs, or robbers.

There is a chief, or aga, who commands the caravan, and is attended by a certain number of janizaries, or other militia, according to the countries from whence the caravans ſet out; which number of ſoldiers muſt be ſufficient to defend them, and conduct them with ſafety to the places for which they are deſigned, and on a day appointed. The caravan encamps every evening near ſuch wells, or brooks, as their guides are acquainted with; and there is as ſtrict diſcipline obſerved upon this occaſion, as in armies in time of war. Their beaſts of burden are moſt commonly camels, who are capable of undergoing a very great fatigue.

Caravan is alſo uſed for the voyages or campaigns which the knights of Malta are obliged to make at ſea againſt the Turks and corſairs, that they may arrive at the commandaries or dignities of the order.

The reaſon of their being thus called, is becauſe the knights have often ſeized the caravans going from Alexandria to Conſtantinople.

CARAVANIER, a perſon who leads the camels, and other beaſts of burden, who are commonly uſed in the caravans in the Eaſt.

CARAVANSERA, or Karavansera, a place appointed for receiving and loading the caravans.

It is commonly a large ſquare building, in the middle of which there is a very ſpacious court; and under the arches, or piazzas that ſurround it, there runs a bank, raiſed ſome feet above the ground, where the merchants, and thoſe who travel with them in any capacity, take up their lodgings, as well as they can: the beaſts of burden being tied to the foot of the bank. Over the gates that lead into the court, there are ſometimes little rooms, which the keepers of the caravanſeras let out at a very high price, to ſuch as have a mind to be private.

The caravanſeras in the Eaſt are ſomething in the nature of the inns in Europe, only that you meet with little accommodation, either for man or beaſt, but are obliged to carry almoſt every thing with you: there is never a caravanſera without a well or ſpring of water. Theſe buildings are chiefly owing to the charity of the Mahometans: they are eſteemed ſacred dwellings, where it is not permitted to inſult any perſon, or to pillage any of the effects that are depoſited there. They even carry their precautions ſo far, as not to ſuffer any man who is not married to lodge there; becauſe they are of opinion that a man who has no wife is more dangerous than another.

CARAVANSERASKIER, the ſteward or keeper of a caravanſera.

He keeps an account of all the merchandizes that are ſold upon truſt, and demands the payments of the ſums due to the merchants for what has been ſold in the caravanſera, on the ſeller's paying two per cent.

CARAWAY, Carraway, the Engliſh name of the carui of botaniſts. See the article Carui.

CARBUNCLE, in natural hiſtory, a very elegant gem, whoſe colour is a deep red, with an admixture of ſcarlet.

This gem was known among the ancients by the name of anthrax. It is uſually found pure and faultleſs, and is of the ſame degree of hardneſs with the ſapphire: it is naturally of an angular figure; and is found adhereing, by its baſe, to a heavy and ferrugineous ſtone of the emery kind: its uſual ſize is near a quarter of an inch in length, and two thirds of that in diameter in its thickeſt parts: when held up againſt the ſun it loſes its deep tinge, and becomes exactly of the colour of a burning charcoal; whence the propriety of the name which the ancients gave it. It bears the fire unaltered, not parting with its colour, nor becoming at all the paler by it. It is only found in the Eaſt-Indies, ſo far as is yet known, and there but very rarely.

Carbuncle, or Anthrax, in ſurgery, an inflammation which ariſes, in time of the plague, with a veſicle or bliſter, almoſt like thoſe produced by burning. This inflammation, for the moſt part, terminates in a ſphacelus, and putrifies the ſubjacent parts down to the bone, they becoming as black as a coal. A carbuncle always breaks out very ſpeedily, even in the ſpace of an hour or two, attended with heat and pain: as ſoon as it is opened, it diſcharges a livid ſanies, or ſometimes a limpid water: it is black within, which is a ſign that the ſphacelus has ſeized the ſubjacent parts, and is making its progreſs; but the putrid fleſh in thoſe who recover ſuppurates, and parts from the ſound. The ſize of theſe peſtilential bliſters is various, more or leſs; as is alſo their number in the patient; for there is no part of the body which they do not infeſt, and they generally appear in company with buboes. See Buboe.

Thoſe carbuncles which ariſe in the face, neck, breaſt, or armpits, are obſerved to be of the worſt kind; for they generally kill the patient. As to the internal treatment of carbuncles, the very ſame is to be obſerved in this caſe as has been recommended under the article *peſtilential* Buboes.

In the external treatment, ſome of the modern phyſicians uſe only ſcarification in this caſe, with very good ſucceſs; others only open the eruptions with a pair of ſciſſars, and having diſcharged the matter, they frequently waſh the carbuncle with *ſp. vin. camph.* or *ſp. vin.* wherein has been digeſted a little theriaca: they afterwards apply a maturating cataplaſm, which is to be continued till the carbuncle ſeparates from the ſound parts; then they cut it out all at once.

Carbuncle, in heraldry, a charge or bearing, conſiſting of eight radii, four whereof make a common croſs, and the other four a ſaltier.

Some call theſe radii buttons, or ſtaves, becauſe round; and enriched with buttons, or pearled like pilgrims ſtaves, and frequently tipped or terminated with flower de-luces: others blazon them, royal ſceptres, placed in ſaltier, pale and feſſe.

CARCASE, in architecture, the ſhell or ribs of a houſe, containing the partitions, floors, and rafters, made by carpenters; or it is the timber-work, or as it were the ſkeleton, of a houſe, before it is lathed and plaiſtered; it is otherwiſe called the framing.

CARCASSE, or Carcuss, in the art of war, an iron-caſe or hollow capacity, about the bigneſs of a bomb, of an oval figure, made of ribs of iron, filled with combuſtible matters, as meal-powder, ſalt petre, ſulphur, broken glaſs, ſhavings of horns, turpentine, tallow, &c. the deſign of it is to be thrown out of a mortar to ſet houſes on fire, and do other execution. It has two or three apertures through which the fire is to blaze.

CARCINOMA, καρκινωμα, among phyſicians, the ſame with cancer. See the article Cancer.

CARDS, among gameſters, little pieces of fine thin paſteboard of an oblong figure, of ſeveral ſizes, but moſt commonly in England three inches and an half long, and two and a half broad, on which are painted ſeveral points and figures.

The moulds and blocks for making cards are exactly like thoſe that were uſed for the firſt books: they lay a ſheet of wet or moiſt paper on the block, which is firſt ſlightly done over with a ſort of ink made with lamp-black diluted in water, and mixed with ſome ſtarch to give it a body. They afterwards rub it off with a round liſt. The court-cards are coloured by means of ſeveral patterns, ſtiled ſtane-files: theſe conſiſt of papers cut through with a pen-knife, and in theſe apertures, they apply ſeverally the various colours, as red, black, &c. Theſe patterns are painted with oil-colours, that the bruſhes may not wear them out; and when the pattern is laid on the paſteboard, they ſlightly paſs over it a bruſh full of colour, which, leaving it within the openings, forms the face or figure of the card.

Cards, upon ſufficient ſecurity, may be exported without payment of the ſtamp-duty; but for every pack ſold without the label of the ſtamp-office in England, the vender incurs a penalty of fifty pounds.

Card, among manufacturers, a ſort of inſtrument or comb, compoſed of a great number of ſmall pieces or teeth of iron wire, incurvated or bent, like a hook, near the middle, and faſtened very cloſely together by the baſes or feet in rows.

Card-Making, the buſineſs of making cards for the manufacturers.

A piece of thick leather, of the ſize intended for the card, is ſtrained in a frame for that purpoſe, and then pricked full of holes, into which the teeth or pieces of iron wire are inſerted. After which the leather is nailed by the edges to a flat piece of wood, in the form of an oblong ſquare, about a foot in length, and half a foot in breadth, with a handle placed in the middle of one of the longer ſides.

The teeth are made in the following manner: The wire being drawn of the ſize intended, a ſkain or number of wires are cut into proper lengths by means of a guage; and then doubled in a tool contrived for that purpoſe. After which they are bent into the proper direction by means of another tool, and then placed in the leather, as mentioned above.

Explanation of Plate XXXIV.

The upper compartment of the plate repreſents a card-maker's ſhop, with the men employed in the various operations.

Fig. 1. is a workman pricking holes with a tool, called a fork or double piercer, in the leather ſtretched upon the frame.

Fig. 2. a workman employed in fixing the teeth in the leather ſtretched upon the frame, and pierced by the workman, *fig.* 1.

Fig. 3. a workman preparing the wood of the card.

1, 2, 3, tools, parts of cards, &c. uſed in this buſineſs.

Lower Compartment.

Fig. 1. the frame drawn from a larger ſcale. A A, *a a*, the two ſides of the frame to which the edges of the leather are faſtened.

B B, *b b*, two male ſcrews for ſtretching the leather on the frame.

C, C, two ears or parts of the leather longer than the reſt, through which two ſtrings are drawn in order to give the leather a more equal tenſion.

Fig. 2. the leather pierced with holes.

Fig. 3. the fork, or double piercer.

Fig. 4. the gauge or tool by which the wire teeth are cut of a proper length. A, the caſe of the gauge. B, a ſkain or number of wires, which are raiſed or lowered by means of the nut E of the ſcrew D. C, the head of the gauge. G, the lower part or place where the ſkain is marked in order to be cut off when puſhed up to C.

Fig. 5. a length or part of the ſkain of wire cut off by the gauge.

Fig. 5. N°. 2. the doubler or tool by which the wires are doubled. A, the ſhaft or part fixed in a hole in the table. C, C, the cheeks or ſides of the doubler. D, the flap or lever by which the operation is principally performed. D, D, D, E, G, &c. cerfs or cuts made in the face of the doubler, and in which the wires are placed. E, E, E, the bridge of the doubler.

Fig. 6. a double tooth, after it is bent into the right-angles *a*, *b*, by the doubler. *a b*, forms the baſe or bottom of the double tooth, and *c d* are the points.

Fig. 6. N°. 2. a table on which the double teeth are crooked. A B C D, the ledges of the table. E F, a ſquare piece of wood, one end of which reſts upon the ledge of the table, and the other on a croſs-piece G H. It is faſtened to the table by means of the cord I K K. L M, is a piece of iron faſtened to the above piece by means of the two ſcrews L, M. At O are two notches, and the inner part of the iron plate fixed at a proper angle. Into theſe notches the double tooth is forced by means of a tool called a gutter, and by that means acquires the requiſite bend. *a b c d*, *a b c d*, are double teeth before they are bent; and *n o p q r*, &c. double teeth after they are bent, or properly formed for being fixed in the leather by the workman, *fig*. 2. in the upper compartment.

Fig. 6. N°. 3. E E, the tool called a gutter.

Fig. 7. A view of the under-ſide of the leather furniſhed with teeth.

Fig. 8. View of the upper-ſide of the ſame leather furniſhed with teeth.

Fig. 9, and 10. Tools for dividing and placing the teeth properly after the leather is nailed to the wood.

There are always two cards neceſſary in the operation of carding, and between which the materials to be carded are placed.

CARDAMINE, lady's ſmock, in botany, a genus of plants, the coralla of which, conſiſting of four petals, are oval, oblong, open, and terminating in erect ungues of double the length of the cup. The fruit is a long pod, of a compreſſed, cylindric ſhape, compoſed of two valves, and containing two cells, wherein are ſeveral roundiſh ſeeds.

CARDAMOM, in the Materia Medica, a dried fruit or pod, brought from the Eaſt Indies; divided internally into three cells, in each of which are contained two rows of triangular ſeeds, of a browniſh colour on the outſide and white within. They are diſtinguiſhed by the epithets *majus* and *minor*.

CARDAMOMUM *Minor*, the leſſer cardamom, has ſhort triangular huſks, ſcarce half an inch in length; the produce of a plant with reed-like ſtalks, and is deſcribed in the *Hortus Malabaricus*, under the name of elettari.

Theſe ſeeds, freed from the huſks, are an elegant and uſeful aromatic, of a grateful ſmell and flavour, very warm, yet not fiery, or ſubject, like the ſpices of the pepper kind, to produce immoderate heat. The huſks ſhould be ſeparated only at the time of uſe; for the ſeeds ſoon loſe a part of their flavour, in being kept without this defence.

Their virtue is extracted not only by rectified ſpirit, but almoſt completely by water alſo, with this difference, that the watery infuſion is cloudy or turbid, the ſpirituous clear and tranſparent; the colour of both is a pale yellow. Scarcely any of the aromatic ſeeds give out ſo much of their warmth to watery menſtrua, or abound ſo much with gummy matter, which appears to be the principle by which the aromatic part is made diſſoluble in water: the infuſion is ſo mucilaginous, even in a dilute ſtate, as hardly to paſs through a filter.

In diſtillation with water, a conſiderable quantity of eſſential oil ſeparates from the watery fluid, of a pale yellowiſh colour, in ſmell exactly reſembling the cardamoms, and of a very pungent taſte: the remaining decoction is diſagreeably bitteriſh, and mucilaginous, retaining nothing of the pungency or warmth, any more than of the peculiar flavour of the ſpice. On inſpiſſating the tincture made in rectified ſpirit, a part of the flavour of the cardamoms ariſes with the ſpirit, but the greateſt part remains behind concentrated in the extract; which ſmells moderately of the ſeeds, and has a pungent aromatic taſte, very durable in the mouth, and rather more grateful than that of the ſeeds in ſubſtance.

Tinctures of this ſpice, both in rectified and proof ſpirit, are more agreeable than the watery infuſions; and proof ſpirit impregnated with its flavour by diſtillation, more agreeable than the ſimple diſtilled water. A tincture of ſix ounces of the ſeeds in a quart of proof ſpirit, and a ſpirituous water more lightly flavoured with them, by drawing off a gallon of proof ſpirit from four ounces, are kept in the ſhops, and occaſionally made uſe of as pleaſant warm cordials, and for flavouring other medicines. It is obſerved, that none of the aromatics anſwer, in general, ſo well as the tincture of this ſpice, for rendering mineral waters and other ſaline liquors acceptable to the ſtomach.

CARDAMOMUM *Majus*, the greater cardamom, called alſo grana Paradiſi, grains of Paradiſe. See GRANA *Paradiſi*.

CARDIAC, an appellation given to ſuch medicines as preſerve, or increaſe the ſtrength of the heart, and by that means the vital forces, though they do not immediately work upon the heart, nor are particularly appropriated to the corroboration of that part. This effect they perform either by repleniſhing the exhauſted veſſels with good humours, or exciting motion when it is required: therefore nutritives duly choſen, with reſpect to particular conſtitutions, belong to this claſs, as well as aſtringent corroboratives and ſtimulants. All the modern diſpenſatories are full of cardiacs or cordials, both of the dry and liquid kind; but the beſt are thoſe which remove the diſorder, of which lowneſs of ſpirits is the conſequence; and next to theſe is wine, which adminiſtered in proper quantities, and more or leſs diluted, as circumſtances require, will generally anſwer better purpoſes than more pompous cordials, whilſt it is leſs capable of doing miſchief.

CARDIACA, mother-wort, a diſtinct genus of plants, with ſquare branched ſtalks, the leaves ſet in pairs on long pedicles at the joints, and the flowers in cluſters round the upper joints: the leaf is dark coloured, cut deeply into three ſharp-pointed indented ſegments, of which the middle one is longeſt, and the two lateral ones commonly again deeply cut: the flower is purpliſh, labiated, with the upper lip long and arched, the lower ſhort and cut into three ſections. It is perennial, grows wild in waſte grounds, and flowers from the middle to the end of ſummer.

This plant is ſaid to be uſeful in diſorders of the ſtomach proceeding from thick phlegm; to looſen the belly; to promote perſpiration, urine, and the uterine purgations. Such, in effect, are the virtues which may be expected from its ſenſible qualities. The leaves and the tops have a moderately ſtrong ſmell, not very agreeable; and a very bitter taſte. In keeping for ſome time, or on boiling them in water, their ſmell is diſſipated: the decoction, inſpiſſated to the conſiſtence of an extract, diſcovers to the taſte a ſtrong penetrating ſubſaline bitterneſs.

CARDIACUS PLEXUS, in anatomy, a plexus or piece of net-work, formed of a ramification of the par vagum, or eighth pair of nerves.

PLATE XXXIV. facing Card Making

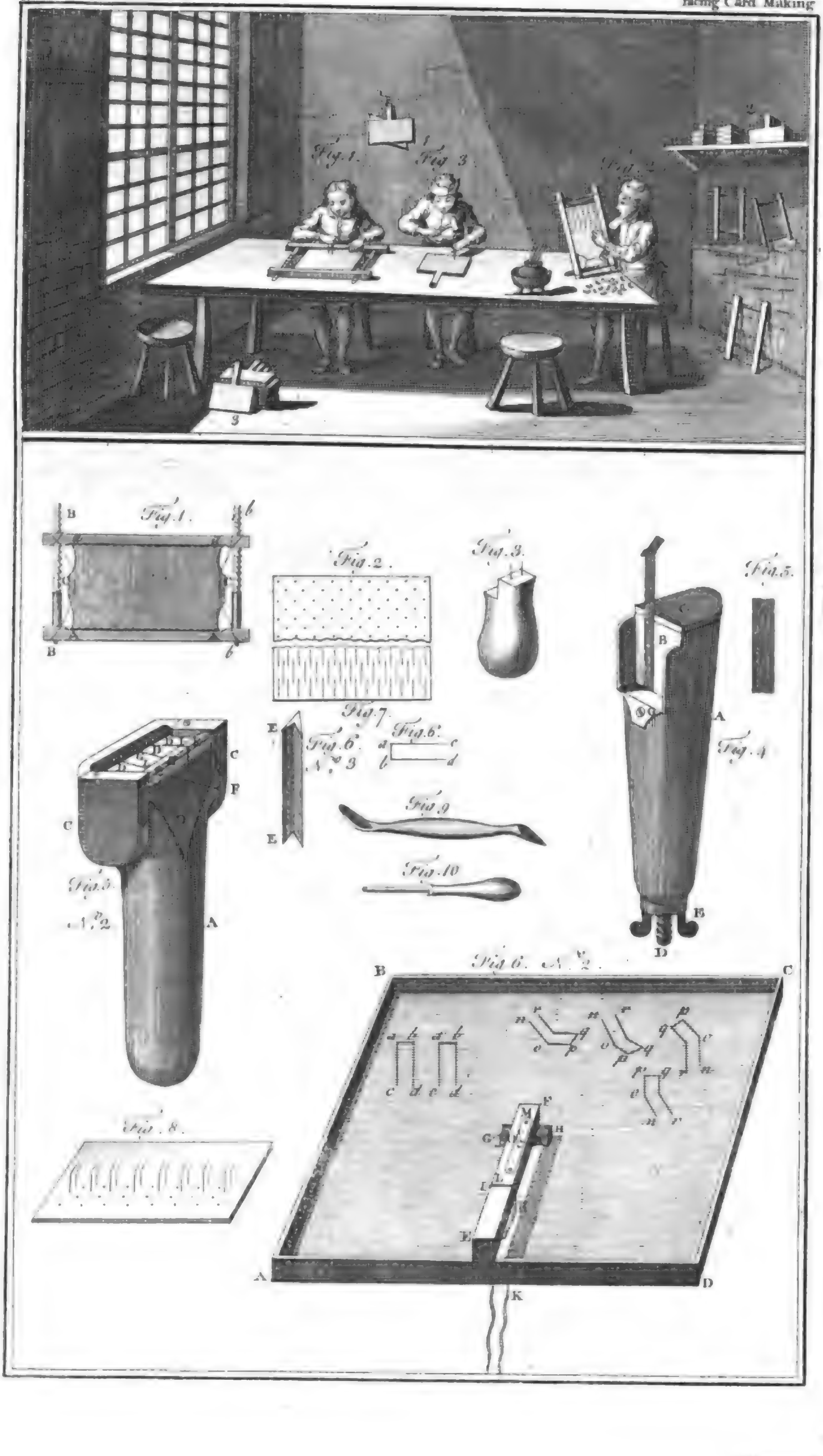


Fig.1
Fig 3
Fig.2
3
B
b
Fig.1
B
b
Fig.2
Fig.7
Fig.3
C
B
A
Fig.4
E
D
Fig.5
E
Fig.6
N.o3
E
Fig.6
a
c
b
d
Fig.9
Fig.10
C
F
C
Fig.5
N.o2
A
Fig.6 N.o2
B
C
a b a b
c d c d
n r q o p
A
D
E
M F
G H
I L
K
Fig.8

and perfectly free from veins, are thoſe which our jewellers generally make uſe of for ſeals, though the variegated ones are much more beautiful. The carnelian is tolerably hard, and capable of a very good poliſh: it is not at all affected by acid menſtruums; the fire diveſts it of a part of its colour, and leaves it of a pale red; and a ſtrong and long continued heat will reduce it to a pale dirty grey.

The fineſt carnelians are thoſe of the Eaſt-Indies; but there are very beautiful ones found in the rivers of Sileſia and Bohemia; and we have ſome not deſpicable ones in England.

Though the ancients have recommended the carnelian as an aſtringent, and attributed a number of fanciful virtues to it, we know no other uſe of the ſtone, than the engraving ſeals on it, to which purpoſe it is excellently adapted, as being not too hard for cutting, and yet hard enough not to be liable to accidents, to take a good poliſh, and to ſeparate eaſily from the wax.

CARNIVAL, or Carnaval, a time of rejoicing, a ſeaſon of mirth, obſerved with great ſolemnity by the Italians, particularly at Venice, holding from Twelfth-day till Lent.

CARNIVEROUS, an appellation given to animals which naturally feed on fleſh, and thence called beaſts or birds of prey.

The word is compounded of the Latin, *caro*, fleſh, and *voro*, to devour.

CARNOSITY, a term ſometimes uſed for an excreſcence, or tubercle, in the urethra.

CARO Musculosa Quadrata, in anatomy, the ſame with the palmaris brevis. See the article Palmaris.

CAROB-Tree, in botany, a genus of plants, the fruit of which is a pod of about a ſpan long, of a flattiſh figure, containing a brown coloured ſweet pulp, which is uſed by the Egyptians and Arabians as ſugar. The tree is found wild alſo in ſome of the ſouthern parts of Europe: it is raiſed among us in the gardens of the curious, but does not in this climate ripen its fruit.

The pulp of the carob is diſſolved more effectually by water than by ſpirit. Out of ſixteen drams of the dry pulp, water took up eleven drams; rectified ſpirit extracted from the remainder only five grains, leaving five drams of mere ſhells or membranes. The ſame quantity, treated firſt with ſpirit, gave out but nine drams ten grains, and afterwards to water five ſcruples, five drams; ten grains being left. The watery extract is ſweeter and more agreeable than the ſpirituous, and the ſpirituous extract made after water is manifeſtly unctuous. The watery extract made after ſpirit diſcovers ſome ſaline matter. The watery decoctions are of a reddiſh-brown colour; and in inſpiſſation turn almoſt black: the fruit gives a deep colour to many freſh parcels of water. Spirit on the other hand ſoon ceaſes to extract any tincture, and the firſt deepeſt tincture is only of a yellowiſh-brown: nevertheleſs, the ſpirituous extract, made after water, inclines to black. *Neumann's Chemiſtry.*

CAROLOSTADIANS, in church hiſtory, an ancient branch of Lutherans, who denied the real preſence in the euchariſt. See the article Eucharist.

CAROLUS, an ancient Engliſh broad piece of gold, ſtruck under Charles I. Its value has of late been at twenty-three ſhillings ſterling, though at the time it was coined, it is ſaid to have been rated at twenty ſhillings.

Carolus, a ſmall copper coin, with a little ſilver mixed with it, ſtruck under Charles VIII. of France.

The carolus was worth twelve deniers, when it ceaſed to be current.

Thoſe which are ſtill current in trade, in Lorrain, or in ſome neighbouring provinces, go under the name of French ſols.

CAROTEEL, in commerce, an uncertain weight or quantity of goods: thus a caroteel of cloves is from four to five hundred weight; of currants, from five to nine; of mace, about three hundred; of nutmegs, from ſix to ſeven hundred and a half.

CAROTIDS, in anatomy, two arteries of the neck, which convey the blood from the aorta to the brain, one called the right carotid, and the other the left: they ariſe near each other, from the curvature of the aorta, and run upon each ſide of the arteria trachea, between it and the internal jugular vein, as big as the larynx, without any ramification; each of theſe is then ramified into two branches, one named internal, the other external. The internal carotid artery having paſſed the great canal of the apophyſis petroſa of the os temporis, ſends off a branch through the ſphenoidical fiſſure, to the orbit of the eye, and ſoon afterwards another through the foramen opticum, by which it communicates with the external carotid. The external is the ſmalleſt; it runs between the external angle of the lower jaw, and the parotid gland; afterwards it aſcends on the fore-ſide of the ear, and ends in the temples. All the ramifications of the carotids are covered by the pia mater, in the duplicature of which they are diſtributed, and form capillary, reticular textures, in great numbers; afterwards they are loſt in the inner ſubſtance of the brain. See the article Artery.

CARUCAGE, or Caruage, a term in huſbandry for the ploughing of ground, either ordinary, for grain, hemp, and flax; or extraordinary, for woad, dyers-weed, rape, &c.

CARP, in ichthyology, the Engliſh name of the cyprinus, with four cirri, or beards, and the third ray of the back-fins armed with ſmall hooks.

The carp is generally taken for the queen of freſh-water fiſh: it is ſubtle, and lives the longeſt of all fiſh, except the eel, out of its proper element. It is obſerved to breed ſeveral months in one year; for which reaſon you hardly ever take either male or female without melt or ſpawn; but they breed more naturally in ponds, than in running water, and in the latter very ſeldom or never. In the places they frequent, their ſtock is innumerable. To make a carp fat and very large, rake all the ſides of your pond, when the water is fallen away, about April, and ſow hay ſeeds, the growth of which, when winter comes and overflows it, will feed them, and make them very fat.

CARPENTER, an artificer in wood, deſigned for the purpoſes of building.

Ship-Carpenter, one employed in building or repairing ſhips. See the article Ship-Building.

CARPENTRY, the art of cutting, framing, and joining large pieces of wood for the uſe of building. It is one of the arts ſubſervient to architecture, and is divided into houſe-carpentry and ſhip-carpentry: the firſt is employed in raiſing, roofing, flooring of houſes, &c. and the ſecond in the building of ſhips, &c. The rules in carpentry are much the ſame with thoſe of joinery; the only difference is, that carpentry is uſed in the larger coarſer work, and joinery in the ſmaller and curious. See Joinery.

CARPET, a ſort of covering of ſtuff, or other materials, wrought with the needle or in a loom, forming part of the furniture of a houſe, and is commonly ſpread over tables, or laid upon the floor.

Perſian and Turky carpets are thoſe moſt eſteemed; though at Paris there is a manufactory after the manner of Perſia, where they make them little inferior, not to ſay finer, than the true Perſian carpets. They are velvety, and perfectly imitate the carpets which come from the Levant. There are alſo carpets of Germany, ſome of which are made of woollen ſtuffs, as ſerges, &c. and called ſquare carpets: others are made of wool alſo, but wrought with the needle, and often embelliſhed with ſilk; and laſtly, there are carpets made of dog's hair. We have likewiſe carpets made in England equal to any brought from the Eaſt.

CARPINUS, the horn-beam, in botany, a genus of plants; in the male flower of which there is no corolla, nor calyx in the female; but the male flowers are arranged into a cylindric amentum, and the female into an oblong one; there is no pericarpium, but the amentum, growing very large, contains at the baſe of each ſquamula, an oval, angulated nut.

CARPOBALSAM, in the materia medica, the fruit of the tree which yields the true oriental balſam.

The carpobalſam is uſed in Egypt, according to Proſper Alpinus, in all the intentions for which the balſam itſelf is applied: but the only uſe the Europeans make of it is in Venice-treacle and mithridate, and in theſe not a great deal; for cubebs and juniper berries are generally ſubſtituted in its place.

CARPOCRATIANS, heretics who ſprung up towards the middle of the ſecond century, being a branch of the ancient Gnoſtics. They held a community of wives; and maintained, that a man cannot arrive at perfection without having paſſed through all criminal actions; laying down as a maxim, that there is no action bad in itſelf, but only from the opinion of men. Accordingly they are charged with committing the moſt infamous actions at their love feaſts. They attributed the creation of the world to angels; they ſaid that Jeſus was born in a manner like other men; they rejected the reſurrection of the body; and marked their diſciples at the bottom of the right ear with a hot iron, or with a razor.

CARPUS, the wriſt, in anatomy. See the article WRIST.

CARR, among the ancients, a kind of throne mounted on wheels, and uſed in triumphs and other ſolemn occaſions.

CARRAC, the name of the veſſels employed by the Portugueſe in the Eaſt-India and Braſilian trade; they are very large, and fitted for fighting as well as for burden.

CARRAT, or CARACT. See CARACT.

CARRIAGE, a vehicle ſerving to convey perſons, goods, merchandizes, and other things from one place to another.

There are public and private carriages, as alſo water and land-carriages. Water-carriages, in general, are thoſe veſſels which ſerve to carry perſons or merchandize by ſea, rivers, lakes, &c. as ſhips, barks, wherries, boats, &c.

Land-carriages are machines invented to carry more conveniently, and in greater number, perſons or goods. Thoſe moſtly uſed in Europe are coaches, chariots, calaſhes, berlins, waggons with four wheels, chaiſes, carts, and drays with two wheels, all drawn by horſes, mules, buffaloes, oxen, &c. and in Lapland and Siberia, by rein-deer.

Letter or Bill of CARRIAGE, a writing given to a carrier or the maſter of any carriage, containing the number and quality of the pieces, bales, &c. of merchandizes, which he is entruſted with, that he may demand the payment of the carriage, and that the perſon to whom they are addreſſed may ſee whether they are delivered in the ſame number, and in as good condition as they were given to the carrier.

CARRIAGE *of a Cannon*, the frame or timber-work on which it is mounted, ſerving to point it in ſhooting, or to carry it from one place to another. It is made of two planks of wood, commonly one half the length of the gun, called the cheeks, and joined by three wooden tranſums, ſtrengthened with three bolts of iron. It is mounted on two wheels; but on a march has two fore-wheels, with limbers added. The principal parts of a carriage are the cheeks, tranſums, bolts, plates, train, bands, bridge, bed, hooks, trunion-holes, and capſquares.

Block CARRIAGE, a cart made on purpoſe for carrying mortars and their beds from place to place.

Truck CARRIAGE, two ſhort planks of woods ſupported on two axle-trees, having four trucks of ſolid wood for carrying mortars or guns upon batteries, where their own carriages cannot go. They are drawn by men.

CARRIAGE, in agriculture, a furrow for the conveyance of water to overflow and improve the ground. It is diſtinguiſhed into two ſorts; the main carriage, which ſhould be made with a convenient deſcent; and the leſſer carriages, which ſhould be ſhallow, and as many in number as poſſible.

CARROT, *Daucus*, in botany, a genus of plants, whoſe characters are:

It hath, for the moſt part, a fleſhy root: the leaves are divided into narrow ſegments: the petals of the flower are very unequal, and ſhaped like an heart; the umbel, when ripe, is hollowed and contracted, appearing ſomewhat like a bird's neſt: the ſeeds are hairy, and in the ſhape of lice.

Carrots are propagated at two or three different ſeaſons, or ſometimes oftener, where people are fond of young carrots through all the ſummer months. The firſt ſeaſon for ſowing the ſeeds is ſoon after Chriſtmas, if the weather is open, which ſhould be in warm borders, under walls, pales, or hedges: but they ſhould not be ſown immediately cloſe thereto; but a border of lettuce, or other young ſallad-herbs, of about a foot wide, ſhould be next the wall, for otherwiſe they would run up to ſeed, without making any tolerable roots.

They delight in a warm, light, ſandy ſoil, which ſhould be dug pretty deep, that the roots may the better run down; for if they meet with any obſtruction, they are very apt to grow forked, and ſhoot out lateral roots, eſpecially when the ground is too much dunged the ſame year that the ſeeds are ſown, before it be conſumed, and mixed with the earth.

Theſe ſeeds have a great quantity of ſmall forked hairs upon thin borders, by which they cloſely adhere, ſo that they are difficult to ſow even, ſo as not to come up in patches; you ſhould therefore rub it well through both hands, whereby the ſeed will be ſeparated before it is ſown: then you ſhould chuſe a calm day to ſow it; for if the wind blows, it will be impoſſible to ſow it equal; for the ſeeds, being very light, will be blown into heaps. When the ſeed is ſown, you ſhould tread the ground pretty cloſe with your feet, that it may be buried, and then rake the ground level.

When the plants are come up, you ſhould hoe the ground with a ſmall hoe about three inches wide, cutting down all young weeds, and ſeparating the plants to four inches diſtance each way, that they may get ſtrength; and in about three weeks after, when the weeds begin to grow again, you ſhould hoe the ground over again a ſecond time, in which you ſhould be careful not to leave two carrots cloſe to each other, as alſo to ſeparate them to a greater diſtance, cutting down all weeds, and ſlightly ſtirring the ſurface of the ground in every place, the better to prevent young weeds from ſpringing, as alſo to facilitate the growth of the young carrots.

In about three weeks or a month after, you muſt hoe them a third time, when you muſt clear the weeds as before; and now you ſhould cut out the carrots to the diſtance they are to remain, which muſt be proportioned to the ſize you intend to have them grow: if they are to be drawn, while young, five or ſix inches aſunder will be ſufficient; but if they are to grow large before they are pulled up, they ſhould be left eight or ten inches diſtant every way: you muſt alſo keep them clear from weeds, which, if ſuffered to grow amongſt the carrots, will greatly prejudice them.

The ſecond ſeaſon for ſowing the ſeeds is in February, on warm banks ſituated near the ſhelter of a wall, pale, or hedge; but thoſe which are intended for the open large quarters ſhould not be ſown before the beginning of March, nor ſhould you ſow later than the end of the ſame month; for thoſe which are ſown in April or May, will run up to ſeed before their roots have any bulk, eſpecially if the weather ſhould prove hot and dry.

In July you may ſow again for an autumnal crop; and in the end of Auguſt you may ſow ſome to ſtand the winter; by which method you will have early carrots in March, before the ſpring ſowing will be fit to draw; but theſe are ſeldom ſo well taſted, and are often very tough and ſticky. Many people mix ſeveral other ſorts of ſeeds as leek, onion, parſnip, radiſh, &c. amongſt their carrots; and others plant beans, &c. but in my opinion, neither of theſe methods are good; for if there is a full crop of any of theſe plants, there can be no room for any thing elſe amongſt them; ſo that what is got by one is loſt by the other: and, beſides, it is not only more ſightly, but better, for the plants of each kind to be ſown ſeparate; and alſo by this means your ground will be clear, when the crop is gone, to ſow or plant any thing elſe; but when three or four kinds are mixed together, the ground is ſeldom at liberty before the ſucceeding ſpring: beſides, where beans, or any other tall growing plants, are planted amongſt the carrots, it is apt to make them grow more in top than root; ſo that they will not be half ſo large as if ſown ſingly without any other plants amongſt them.

But in order to preſerve your carrots for uſe all the winter and ſpring, you ſhould about the beginning of November, when the green leaves are decayed, dig them up, and lay them in ſand in a dry place, where the froſt cannot come to them, taking them out from time to time as you have occaſion for them, reſerving ſome of the longeſt and ſtraighteſt roots for ſeed, if you intend to ſave any; which roots ſhould be planted in the middle of February, in a light ſoil about a foot aſunder each way, obſerving to keep the ground clear from weeds; and about the middle of Auguſt, when you find the ſeeds are ripe, you muſt cut it off, and carry it to a dry place, where it ſhould be expoſed to the ſun and air for ſeveral days to dry: then you may beat out the ſeeds, and put it up in bags, keeping it in a dry place till you uſe it. This ſeed is ſeldom eſteemed very good after the firſt or ſecond year at moſt; but new ſeed is always preferred, nor will it grow when it is more than two years old. *Miller's Gard. Dict.*

The Flemings have long known the advantage of feeding their cattle with carrots; though it is but of late years that this root has been cultivated for that purpoſe in the fields in England: nor does this uſeful and profitable practice extend even now to more than a few parts of this country; though there is ſcarce any root yet known, which is more heartening food for moſt ſorts of animals, or which better merits the huſbandman's attention; as one acre of carrots, well planted, will fatten a greater number of ſheep, or bullocks, than three acres of turnips, and at the ſame time their fleſh will be firmer, and better taſted. Horſes are extremely fond of this food, and there is not any better for hogs. Theſe roots have alſo been of ſuch excellent ſervice to deer, in parks, that when numbers of theſe valuable creatures have periſhed elſewhere, through want in very hard winters, when there has been an extreme ſcarcity of their uſual food; thoſe that have been fed with carrots have kept their fleſh all the winter, and, upon the growth of the graſs in the ſpring, have been fat early in the ſeaſon. This is not an inconſiderable advantage, in places where the graſs is generally backward in its growth.

This plant has alſo a very great ſuperiority over turnips; namely, that the crop is not ſo liable to fail: for as the carrots are ſown in the ſpring, the plants generally come up well; and unleſs the months of June and July prove very bad, there is no danger of their ſucceeding: whereas turnips are frequently deſtroyed by the fly at their firſt coming up; and in dry autumns they are attacked by the caterpillars, which lay waſte whole fields in a ſhort time. But carrots are not preyed upon by either of theſe vermin. Every farmer who has a ſtock of cattle or ſheep ſhould therefore always have good ſtore of theſe roots. His land will be fit for them, if it be in the proper tilth.

CARROUSAL, a courſe of chariots and horſes, or a magnificent entertainment exhibited by princes on ſome public rejoicing. It conſiſts in a cavalcade of ſeveral gentlemen richly dreſſed and equipped, after the manner of ancient cavaliers divided into ſquadrons, meeting in ſome public place, and practiſing juſts, tournaments, &c.

CART, a land-carriage with two wheels, drawn commonly with horſes, to carry heavy goods, &c. from one place to another.

The uſe of carts being very common, and convenient for the carriage of all ſorts of commodities, the officers of the police in France, and even the king's council, have not judged it unworthy their care and attention to regulate the functions, and often ſettle the price thereof.

Carts, in London and Weſtminſter, are not to carry more than twelve ſacks of meal, or one chaldron of coals, on pain of forfeiting one of the horſes. The wheels are to be of a certain thickneſs, and without iron; and if any perſon ride in a cart, not having another to guide it, he ſhall forfeit ten ſhillings.

CARTEL, an agreement made between two ſtates for the exchange of their priſoners of war. See PRISONER *of War*.

CARTEL ſignifies alſo a letter of defiance, or a challenge, to decide a controverſy, either in a tournament, or in ſingle combat. See the article DUEL.

CARTESIAN *Philoſophy*, the ſyſtem of phyſics advanced by Des Cartes, and maintained by his diſciples the Carteſians.

M. Des Cartes, in order to account for the celeſtial appearances, ſuppoſes that the matter of the world was at firſt divided by the Almighty into innumerable little equal parts, each endued with an equal degree of motion, both about its own center, and ſeparately, in ſuch a manner, that this matter conſtituted a fluid. He alſo ſuppoſed, that ſeveral collections of this matter were endued with a motion about different points, as common centers; which points were placed at equal diſtances, in ſuch a manner, that the matter round them conſtituted different vortices, as he calls them. He farther ſuppoſed, that the firſt particles of matter became, by thoſe inteſtine motions, of a ſpherical figure, and conſequently compoſed globules of ſeveral magnitudes; and theſe he calls the matter of his ſecond element.

But the very ſmall particles which were rubbed off by the aforeſaid motions, from the firſt particles of matter, and driven violently many different ways, made up a new matter, which he calls his firſt element. And ſince there would be more of this firſt element than was ſufficient to fill the vacuities between the globules of the ſecond element, he ſuppoſes that the remaining part would be driven towards the centre, by the circular motion of theſe globules, which did, for that reaſon, recede from it: and this matter, being there amaſſed in a ſphere, would, in the centre of every vortex, produce a body like the ſun; which ſun being thus formed, and moving about its own axis, with the common matter of the vortex, would neceſſarily throw out ſome parts of its matter, through the vacuities of the globules of the ſecond element, conſtituting the vortex; and this eſpecially, at ſuch places as are fartheſt from its poles, receiving at the ſame time, by theſe poles, as much as it loſes in its equatorial parts; and by this means it would be able to carry round with it thoſe globules that are neareſt with a greater velocity, and thoſe that are remote with leſs: ſo that thoſe globules, which are neareſt the centre of the ſun, muſt be leaſt; becauſe, were they greater or equal, they would, by reaſon of their velocity, have a greater centrifugal force, and recede from the centre. And ſhould it happen that any of theſe ſun-like bodies in the centers of the ſeveral vortices ſhould be ſo incruſted and weakened, as to be carried about the vortex of the true ſun; ſhould it happen to be of leſs ſolidity, or leſs motion, than the globules towards the extremity of the ſolar vortex, it would deſcend towards the ſun, till it met with globules of the ſame ſolidity, and capable of the ſame degree of motion with itſelf; and being fixed there, it would for ever after be carried about by the motion of the vortex, without either approaching any nearer to, or receding farther from the ſun; and ſo become a planet.

Suppoſing all this, we are next to imagine that our ſyſtem was at firſt divided into ſeveral vortices, in the centre of each of which was a lucid ſpherical body; and that ſome of theſe, being gradually incruſtated, were ſwallowed up by others, which were larger and more powerful, till at laſt they were all deſtroyed and ſwallowed up by the biggeſt ſolar vortex, except ſome few which were thrown off in right lines, from one vortex to another; and ſo became comets: and from hence it appears, that thoſe planets which are neareſt the ſun, are leſs ſolid; and that is alſo Des Cartes's reaſon why we ſee always the ſame face of the moon; becauſe the hemiſphere, which is oppoſite to the ſun and the earth, is ſomewhat more ſolid than the other; as alſo, becauſe the matter of the firſt element, which makes up the body of the ſun, moves with a greater velocity the parts of the vortex, and the bodies ſwimming in it, than thoſe that are remoter: therefore thoſe planets which are nearer to the ſun, muſt finiſh their periods ſooner than thoſe which are more remote from him. And the reaſon why the planets revolve round their axis is, becauſe, according to this hypotheſis, they were lucid, ſun-like, and revolving bodies before.

Yet, notwithſtanding all this fine chimera, it is; 1. Certain, that a vortex, produced by the revolution of a ſphere about its axis, muſt be propagated in infinitum, if nothing hinder it: and therefore, ſince there muſt be as many vortices as there are fixed ſtars, one vortex would certainly run into another, and every particle would be actuated by a motion compounded of that of all the central ſpheres; which is abſurd, and contrary to that conſtancy, limitation, and uniformity, which is obſerved in the phænomena of the heavenly bodies.

2. Since the motion of the parts of the vortices neareſt the centre is ſwifter than that of the more remote, they muſt preſs upon the exterior parts, and thereby perpetually impart ſomething of their motion to them; and therefore thoſe exterior parts of the vortex will be continually leſſening ſome part of their motion, which being never reſtored, theſe parts muſt ſtill move ſlower and ſlower, till at laſt all the motion will be quite deſtroyed.

3. According to this hypotheſis, each planet is of the ſame denſity with the parts of the vortex in which it ſwims, being governed by the ſame laws of motion, and is, as it were, only ſome concreted parts of the vortex. But the times of the periodical motion of bodies, carried round by a vortex, are in a duplicate ratio of their diſtances from their centre; as Sir Iſaac Newton hath demonſtrated in Sect. IX. of his Principia. Whereas the ſquares of the times of the periodical revolutions of the planets are as the cubes of their mean diſtance from the centre, or from the ſun: wherefore the planets cannot be carried round by a vortex.

4. If a vortex run out in infinitum, then would a body carried round by it certainly deſcribe a perfect circle, unleſs ſomething ſolid hindered it; and therefore the greater the diſtance between thoſe ſolid bounds, or the larger the baſon be which contains the vortex, in reſpect of the orbit of the body carried round in it, the nearer would this orbit be to a circle; that is, the excentricity of the planets neareſt the ſun would be leſs than that of thoſe which are more remote. Whereas the direct contrary to this is true in fact, the excentricity of Mercury being greater than that of Saturn.

5. A body, carried round in a vortex of the ſame denſity with it, would neceſſarily deſcribe a circle, to whoſe plane the axis of the central body, producing the circulation of the fluid, would be perpendicular: and yet there is not one planet to the plane of whoſe orbit the ſun's axis is perpendicular.

6. The comets have their orbits, not only oblique to, but ſometimes at right angles with, the plane of the ecliptic; ſometimes the courſe of theſe comets is diametrically oppoſite to that of the ſun: they perſevere in their motion, without any change. By lines drawn from them to the ſun, they deſcribe equal areas in equal times; and ſometimes they enter into the vortex of the ſun. All which would be impoſſible, if the ſolar vortex moved round forcibly enough to carry theſe vaſt bodies of the planets along with it.

CARTHAMUS, baſtard-ſaffron, in botany, a genus of plants with oval-pointed leaves, ſomewhat prickly about the edges, joined cloſe to the ſtalk, which is round, firm, and branched: on the tops grow large ſcaly heads, with ſaffron-coloured fiſtular flowers, ſtanding out from them: theſe are followed by ſmooth white ſeeds, of an oblong roundiſh ſhape, yet with four ſenſible corners, remarkably heavy, ſo as to ſink in water. It is an annual plant, a native of Egypt, and cultivated in large quantity in ſome parts of Germany, on account of the uſes of its flowers in dying. It is ſometimes raiſed among ourſelves; but the ſeeds, which are the part that has been chiefly made uſe of in medicine, ſeldom come to perfection in this climate.

The ſeeds of carthamus, freed from the ſhells, have an unctuous ſweetiſh taſte, which on chewing them for a little time becomes acrid and diſagreeable: they form an emulſion on trituration with water, and give out to ſpirit a little nauſeous acrid matter. They have been celebrated as a gentle cathartic, in doſes of a dram or two in ſubſtance, and ſix or eight drams in emulſion: but as they operate very ſlowly, and are apt, eſpecially when given in ſubſtance, to occaſion nauſea, flatulencies, and diſtenſions of the ſtomach; their uſe has long been laid aſide, and the colleges, both of London and Edinburgh, have now diſcarded them from their catalogues of officinals.

The flowers have been ſometimes employed as a colouring drug for alimentary and medicinal ſubſtances; and when well cured, are not eaſily diſtinguiſhable by the eye from ſaffron, though they have nothing of its ſmell or taſte. They give a deep ſaffron tincture to rectified ſpirit, and a paler to water.

CARTHUSIANS, a religious order, founded in the year 1080, by one Bruno. Their rules are very ſevere. They are not to go out of their cells, except to church, without leave of their ſuperior; nor ſpeak to any perſon without leave. They muſt not keep any portion of their meat or drink till next day: their beds are of ſtraw, covered with a felt; their cloathing two hair-cloths, two cowls, two pair of hoſe, and a cloak, all coarſe. In the refectory, they are to keep their eyes on the diſh, their hands on the table, their attention on the reader, and their hearts fixed on God. Women are not allowed to come into their churches.

CARTILAGE, in anatomy, is a pearl-coloured ſubſtance, which covers the extremities of bones joined together by moveable articulations, increaſes the volume of ſome of them after the manner of epiphyſes, unites others very cloſely together, and has no immediate adheſion or connexion with others.

The ſubſtance of cartilages is more tender, and leſs brittle, than that of bones; but with age they ſometimes grow ſo hard as to become perfectly bony. They are pliable and elaſtic, and ſo capable of reſtoring themſelves after having been compreſſed, or bent to a certain degree; but, when bent beyond that degree, they break.

All that Winſlow has ſaid is comprehended in the ſhort definition which Carolus Stephanus has given of them in his anatomy. A cartilage, ſays he, is a part of the body which truly deſerves the epithet of ſimple. It is harder than all the other parts, but ſofter than the bones, white, ſmooth, poliſhed, and pliable, or flexible. The coheſion of its parts is different in different cartilages; and no ſenſible cavity, cell, or bone, appears in any part of its ſubſtance, except very ſmall paſſages for the blood-veſſels.

CARTILAGINOUS, ſomething belonging to, or partaking of, the nature of a cartilage.

Cartilaginous *Fiſhes*, or thoſe with cartilaginous fins, conſtitute a claſs or order of fiſhes, otherwiſe called chondropterygious. See the article Chondropterygious.

CARTON, or Cartoon, in painting, a deſign drawn on ſtrong paper, to be afterwards calked through, and transferred on the freſh plaſter of a wall to be painted in freſco.

Carton is alſo uſed for a deſign coloured, for working in moſaic, tapeſtry, &c. The cartons formerly at Hampton-Court, but now at the queen's palace, are deſigns of Raphael Urbin, intended for tapeſtry.

CARTOUCHE, in architecture and ſculpture, an ornament repreſenting a ſcroll of paper. It is uſually a flat member, with wavings, to repreſent ſome inſcription, device, cypher, or ornament of armoury. They are, in architecture, much the ſame as modillions; only theſe are ſet under the cornice in wainſcotting, and thoſe under the cornice at the eaves of a houſe.

Cartouche, in the military art, a caſe of wood, about three inches thick at the bottom, girt with marlin, holding about four hundred muſket-balls, beſides ſix or eight balls of iron, of a pound weight, to be fired out of a hobit, for the defence of a paſs, &c.

A cartouche is ſometimes made of a globular form, and filled with a ball of a pound weight; and ſometimes it is made for the guns, being of ball, of half or quarter pound weight, according to the nature of the gun, tied in form of a bunch of grapes, on a tompion of wood, and coated over. Theſe were uſed in the room of partridge ſhot.

Cartouche is alſo uſed to denote the ſame as a cartridge. See Cartridge.

CARTRIDGE, in the military art, a caſe of paſteboard or parchment, holding the exact charge of a fire-arm. Thoſe for muſkets, carabines, and piſtols, hold both the powder and ball for the charge; and thoſe of cannon and mortars are uſually in caſes of paſteboard or tin; ſometimes of wood, half a foot long, adapted to the caliber of the piece.

Cartridge, in architecture, the ſame as cartouche. See Cartouche.

Cartridge-Box, a caſe of wood or turned iron, covered with leather, holding a dozen muſket cartridges. It is wore upon a belt, and hangs a little lower than the right pocket-hole.

CARUI, or **Caraway**, in botany, an umbelliferous plant, with ſtriated branched ſtalks, two or three feet high, and finely divided leaves, ſet in pairs along a channelled rib, every two of which ribs or pedicles croſs one another at their origin on the ſtalk: the ſeeds are ſmall, of a browniſh or blackiſh colour, flat on one ſide, convex and ſtriated on the other. It is a native of the northern climates: in this kingdom it is rarely found wild; but commonly cultivated in gardens for culinary and confectionary as well as medicinal purpoſes. It is biennial.

Caraway-ſeeds are an uſeful ſtomachic and carminative; of a ſufficiently agreeable aromatic ſmell, and a moderately warm taſte: they are given, in ſubſtance, from a ſcruple to a dram. The leaves have the ſame kind of flavour with the ſeeds, but are conſiderably weaker and leſs grateful. The roots have a ſweetiſh taſte, accompanied with a ſlight warmth, and very little ſmell.

The ſeeds give out the whole of their virtue, by moderate digeſtion, to rectified ſpirit; for after the action of this menſtruum, they prove inſipid and inodorous: the tincture taſtes ſtrongly of the caraways, but their ſmell is in great meaſure covered by the menſtruum. The ſpirit, gently diſtilled off from the filtered liquor, brings over very little of the flavour of the caraways, leaving nearly all their active matter concentrated in the extract, which proves a very warm pungent aromatic. The colour, both of the tincture and extract, is a yellowiſh verging to green.

Infuſions of the ſeeds in water are ſtronger in ſmell than the ſpirituous tincture, but much weaker in taſte: after repeated infuſion in freſh portions of water, they ſtill give a conſiderable taſte to ſpirit. The colour of the watery infuſions is a pale reddiſh brown. In diſtillation or evaporation, water elevates all the aromatic part of the caraways: the remaining extract is almoſt inſipid; and thus diſcovers, that in caraways there is leſs than in moſt of the other warm ſeeds of European growth, of a bitteriſh or ungrateful matter joined to the aromatic. Along with the aqueous fluid there ariſes in diſtillation a very conſiderable quantity, about one ounce from thirty, of eſſential oil, of a bright yellow colour, ſmelling ſtrongly of the caraways; in taſte hotter and more pungent than thoſe obtained from moſt of our other warm ſeeds: this oil is given from one to five or ſix drops, as a carminative; and is ſuppoſed alſo to be of peculiar efficacy for promoting urine, to which it communicates ſome degree of its ſmell. The leaves of the plant afford likewiſe an oil, nearly ſimilar, both in colour and quality, to that of the ſeeds, but in far leſs quantity: ſixteen pounds of the herb in flower, ſtripped from the ſtalks, yielded ſcarcely an ounce. The eſſential oil of the ſeeds is directed as an officinal; as alſo a cordial water, pretty ſtrongly flavoured with them by drawing off a gallon of proof ſpirit from half a pound of the caraways.

CARVING, that branch of ſculpture which regards cutting in wood. See the article Sculpture.

CARUM. See Carui.

CARUNCULA, in anatomy, a term denoting a little piece of fleſh, and applied to ſeveral parts of the body, thus:

Caruncula Lacrymalis, a little eminence ſituated in the larger angle, or canthus of the eye, where there are alſo ſometimes hairs and certain little glands. According to ſome anatomiſts, they help to keep the two puncta open when the eyes are ſhut.

Carunculæ Myrtiformes, fleſhy knobs about the ſize of a myrtle-berry, which owe their origin to the breaking of the hymen, and therefore not to be found in ſubjects in which that membrane exiſts entire. They are two, three, or four in number, and are placed where the hymen was.

Carunculæ Papillares, or **Mamillares**, little protuberances on the inſide of the pelvis of the kidneys. See the articles Pelvis and Kidney.

Carunculæ Cuticulares Alæ, the ſame with nymphæ. See Nymphæ.

CARUNCLES, in the urethra, proceeding from a gonorrhœa, or an ulceration of the urethra, may be removed by introducing the bougie or wax-candle. See the article *Medicated* Candle.

CARUS, in medicine, a ſudden deprivation of ſenſe and motion, affecting the whole body.

Hippocrates ſays, that though a carus is a privation of ſenſe and motion, yet the faculty of reſpiration is not at all injured; and that it is cauſed by an affection of the fore-part of the brain only, the middle ventricle of the brain alſo ſuffering, by conſent of parts, ſo as to diſturb the actions of the rational faculty: but if this carus or ſopor oppreſſes reſpiration to ſo violent a degree, as the patient cannot breathe without great efforts, as thoſe who ſnore under a deep ſleep, it is called apoplexy; the ſolution of which is generally ſucceeded by a paraphlegy: but a carus is generally followed by a good ſtate of health. It is ſometimes taken for a heavy and profound ſleep; from which it is difficult to be raiſed. This carus differs little from a lethargy. See the article Lethargy.

CARYATIDES, or **Cariates**, in architecture, a kind of order of columns or pilaſters, under the figure of women, dreſſed in long robes, after the manner of the Carian people, and ſerving inſtead of columns to ſupport the entablement.

The Caryatides ſhould always have their legs pretty cloſe to each other, and even acroſs, or one athwart the other; their arms laid flat to their bodies, or to the head; and as little ſpread as poſſible: when they are inſulated, they ſhould never have any great weight to ſupport; and they ought always to appear in characters proper to the place they are uſed in.

CARYOCOSTINUM, in pharmacy, an electuary chiefly prepared of cloves, white coſtus, ginger, cummin-ſeeds, &c. much recommended for purging choler, and breaking away obſtructions of cachectic conſtitutions; alſo an excellent purge for ſtrong people.

CARYOPHYLLATA, **Avens**, or herb-benet, a roughiſh plant, with dark-coloured winged leaves, reſembling thoſe of agrimony, and pentapetalous yellow flowers, ſtanding in ten-leaved cups on the tops of the branches, followed each by a round cluſter of hairy ſeeds with hooked tails: the roots are ſlender, full of fibres, of a dark browniſh colour on the outſide, and reddiſh within. It is perennial, grows wild in woods and hedges, and is found in flower greateſt part of the ſummer.

The root of the avens has been employed as a gentle ſtyptic, corroborant, and ſtomachic; and for theſe intentions continues, not undeſervedly, of ſome eſteem in foreign countries, though very little regarded among us. It has a mildly auſtere ſomewhat aromatic taſte; and a very pleaſant ſmell, ſomewhat of the clove kind, eſpecially in the ſpring, and when produced in dry warm ſoils: ſuch as is the growth of cloſe, ſhady, moiſt places, has little and often nothing of this flavour.

CARYOPHYLLUS, the pink, in botany, the ſame with the dianthus of Linnæus. See the article Dianthus.

Caryophyllus Aromaticus, the clove-tree, common in ſeveral iſlands of the Eaſt Indies. The cloves, which are the only part known to us, are properly the cups of the unopened flowers. In ſhape they ſomewhat reſemble a ſhort thick ſquare nail, of a ruſty colour inclining to black: in the inſide of each clove are found a ſtylus and ſtamina, with their apices: at the larger end ſhoot out, from the four angles, four little points like a ſtar, in the middle of which is a round ball, of a lighter colour than the reſt, compoſed of four ſmall ſcales or leaves, which ſeem to be the unexpanded petala of the flower. The tree is one of thoſe, whoſe flower is produced above the rudiments of the fruit: the ripe fruit, ſometimes brought into Europe under the name of antophyllus, is marked on the top with the remains of the flower; it is about the ſize and ſhape of an olive, and contains, under a thin blackiſh ſhell, a hard kernel of the ſame colour, which has a deep longitudinal ſeam on one ſide. The cloves are ſaid to be cured by expoſing them to ſmoke, and afterwards drying them in the ſun.

The clove has a ſtrong agreeable ſmell, and a bitteriſh, hot, very pungent taſte: it is one of the hotteſt and moſt acrid of the ſubſtances of the aromatic claſs, and as ſuch is often uſed, not only internally, but as an external ſtimulant. The antophyllus has the ſame kind of flavour with the clove itſelf; but being far weaker, in ſmell as well as in taſte, it is very rarely applied to any medicinal purpoſes, and is now ſcarcely ever to be met with in the ſhops.

The clove is remarkably diſpoſed to imbibe humidity; and when robbed of its active parts, by infuſion in menſtrua or diſtillation, and afterwards mixed with freſh cloves, it regains from them a conſiderable ſhare both of taſte and ſmell. The Dutch, through whoſe hands this ſpice is brought to us, have often practiſed this abuſe; which, however, may be eaſily diſcovered; for thoſe cloves which have once loſt their virtue, continue always not only weaker than the reſt, but likewiſe of a much paler colour.

Tinctures of cloves in rectified ſpirit are of a dark reddiſh brown colour, of no great ſmell, but of a highly acrid taſte: if the quantity of ſpirit be conſiderable, it leaves the clove deprived of all its virtue. On inſpiſſating the filtered tincture, the ſpirit which diſtils is found to have very little impregnation from the ſpice: the remaining extract, nevertheleſs, does not diſcover ſo much ſmell as the clove in ſubſtance, but its taſte is exceſſively pungent and fiery. The quantity of this burning extract amounts to about one third the weight of the clove.

Digeſted or infuſed in water, they impregnate the liquor more ſtrongly with their ſmell than they do ſpirit, but not near ſo much with their taſte: after repeated infuſion in water, they impart ſtill a conſiderable tincture to rectified ſpirit. In diſtillation with water, they give over, very ſlowly, near one ſixth their weight of eſſential oil; when carefully diſtilled, colourleſs; by age, changing to a yellow, and at length to a reddiſh brown colour; when drawn with a ſtrong fire, proving often of this colour at firſt; ſmelling ſtrongly of the cloves; but in taſte only moderately pungent, much leſs ſo than the ſpirituous extract. Neither the remaining clove nor decoction have any conſiderable taſte; the pungency of this ſpice ſeeming to depend, not on the volatile or fixed parts ſeparately, but on the combination of the two.

The oil of cloves commonly met with in the ſhops, and purchaſed from the Dutch, is indeed highly acrimonious: but this oil is plainly not the genuine diſtilled oil of the clove; for notwithſtanding its being more pungent than that which cloves afford by the common proceſs of diſtillation, it contains a large admixture, oftentimes half its weight or more, of an inſipid expreſſed oil, as appears upon treating it with rectified ſpirit, which diſſolves the pungent aromatic matter, and leaves the groſs inſipid oil. It is probably from an admixture of the reſinous part of the clove, that this ſophiſticated oil receives both its acrimony and high colour. Freſh cloves are ſaid to yield a high coloured, thick, fragrant oil, upon expreſſion: poſſibly the common oil of cloves, brought from the ſpice iſlands, is no other than this oil, diluted with inſipid ones. The college of London ſeems to require both the common and the genuine oil to be kept in the ſhops, making eſſential oil of cloves both an article of the materia medica and an officinal preparation: perhaps the common oil, as being moſt pungent, is beſt adapted for ſome external purpoſes, as the genuine doubtleſs is for thoſe of an internal aromatic.

Caryophillus *Ruber*, the clove july-flower, or gilliflower, in botany, is the name of a plant with many ſmooth, round, jointed ſtalks, and gramineous leaves of a bluiſh-green colour, ſtanding in pairs at the joints: the flower is compoſed of five petals, narrow at the baſes, broad and jagged at the top, ſet in an oblong cylindrical cup, which is covered at the bottom with four ſhort ſcales, forming as it were a ſecondary cup: after the flower has fallen, the calyx becomes a covering to a number of ſmall, flat, wrinkled, black ſeeds. It is perennial, and ſaid to have been a native of Italy.

Several varieties of theſe flowers are cultivated in gardens; but the ſort principally uſed in medicine are of a deep crimſon colour, and of a pleaſant aromatic ſmell, ſomewhat reſembling that of the clove deſcribed in the preceding article. They are chiefly valued for the fine ſmell, which is readily extracted by infuſion in water, and diſſipated even by light coction. Three pounds of the freſh flowers, clipped from their heels, communicate, by infuſion in a cloſe veſſel for a night, a grateful and moderately ſtrong ſmell, and a deep red colour, to eight or nine pints of water; which, with a proper quantity of fine ſugar, forms a very agreeable ſyrup.

On diſtilling the freſh flowers with water, the diſtilled liquor proves conſiderably impregnated with their fragrance. Rectified ſpirit, digeſted on the flowers, receives a much paler tincture than the watery liquors, but extracts the whole of their active matter. In diſtillation the ſpirit elevates much leſs than the water.

CARYOTA, in botany, a genus of plants; the male and female flowers of which are produced in ſeparate parts of the ſame ſpadix; the corolla is divided into three hollow, lanceolated ſegments; the ſtamina are numerous filaments, longer than the corolla; the antheræ are linear; the corolla in the female flower is divided into two very ſmall acuminated ſegments; the fruit is a round berry, containing a ſingle cell; the ſeeds are two, large, oblong, rounded on one ſide, and flatted on the other.

CASCABEL, the knob or button at the end of the breech of a cannon. See the article Cannon.

CASCADE, a ſteep fall of water from a higher into a lower place.

CASCANS, in fortification, holes in form of wells, ſerving as entries to galleries to give vent to the enemies mines.

CASCARILLA, or Eleutheria. See the article Eleutheria.

CASE, *Caſus*, among grammarians, implies the different inflexions or terminations of nouns, ſerving to expreſs the different relations they bear to each other, and to the things they repreſent.

There is great diverſity among grammarians, with regard to the nature and number of caſes; they generally find ſix, even in moſt of the modern languages, which they call the nominative, genitive, dative, accuſative, vocative, and ablative; but this ſeems in compliance with their own ideas of the Greek and Latin, which they transfer to their own languages. The termination is not the ſole criterion of a caſe; for tho' ſome authors reckon five caſes of nouns in the Greek, and ſix in the Latin, yet ſeveral of theſe caſes are frequently alike: as the genitive and dative ſingular of the firſt and fifth declenſions of the Latin; the dative and ablative plural of all the declenſions, &c. the genitive and dative dual of the Greek, &c.

The Engliſh and many other modern languages expreſs the various relations, not by changes in the terminations, as the ancients, but by the appoſition of articles; it is certainly wrong to ſay, that *of a father* is the genitive caſe of *father*, and *to a father* the dative; for *of* and *to* are no part of the word *father*, they are only articles or modifications, which ſhew the different relation of the word *father*.

Case, among printers, denotes a ſloping frame, divided into ſeveral compartments, containing a number of types or letters of the ſame kind.

From theſe compartments the compoſitor takes out each letter as he wants it, to compoſe a page or form. Thus they ſay a caſe of Pica, of Greek, &c.

Case-Hardening, a method of preparing iron, ſo as to render its outer ſurface hard,,and capable of reſiſting any edged tool.

This is a leſſer degree of ſteel-making, and is practiſed by baking, calcination, or cementation in an oven, or other cloſe veſſel, ſtratified with charcoal and powdered hoofs and horns of animals, ſo as to exclude the air. See Steel.

Case-Shot, in the military art, muſket-ball, ſtones, old iron, &c. put into caſes, and ſhot out of great guns.

CASEMENT, or Casemate, in architecture, a hollow moulding, which ſome architects make one ſixth of a circle, and others one fourth.

CASEMATE, or **Cazemate**, in fortification; ſee the article Cazemate.

CASERN, in fortification, lodgings built in garriſon-towns, generally near the rampart, or in the waſte places of the town, for lodging the ſoldiers of the garriſon.

There are uſually two beds in each caſern for ſix ſoldiers to lie, who mount the guard alternately; the third part being always on duty.

CASES Reserved, in the polity of the Roman church, atrocious crimes, the abſolution of which is reſerved by the ſuperiors to themſelves or their vicars.

CASH, in the commercial ſtyle, ſignifies the ſtock of money which a merchant, trader, or banker, has at his diſpoſal in order to trade. Thus we ſay, the caſh of ſuch a banker amounts to ten, twenty, or thirty thouſand pounds.

Cash-Book. See the article Book-Keeping.

CASHEW-NUT, the fruit of the acajou-tree, reckoned by Linnæus a ſpecies of anacardium. See the articles Acajou and Anacardium.

CASHIER, a perſon who is entruſted with the caſh of ſome public company. See the articles Cash and Company.

CASIA, in botany, the ſame with oſyris. See Osyris.

CASING *of Timber-work*, among builders, is the plaſtering a houſe all over on the outſide with mortar, and then ſtriking it while wet by a ruler with the corner of a trowel, to make it reſemble the joints of free-ſtone. Some direct it to be done upon heart laths, becauſe the mortar would, in a little time, decay the ſap laths; and to lay on the mortar in two thickneſſes, viz. a ſecond before the firſt is dry.

CASK, a veſſel of capacity for preſerving liquors of divers kinds, and alſo ſometimes dry goods, as ſugar, almonds, &c.

A caſk of ſugar is a barrel of that commodity, containing from eight to eleven hundred weight. A caſk of almonds is about three hundred weight.

A caſk in ſtaves, that of which all the ſtaves are ready prepared, and want only to be joined and hooped. They are often ſhipped thus on board the veſſels deſigned for the American iſlands, becauſe they take leſs room, and can be eaſily made up there.

CASSAVI, or **Cassada**, the ſame with the jatropha of Linnæus. See the article Jatropha.

Of the root of this plant, which is oblong and thick, the Americans make a kind of bread, ſaid to be a wholeſome and nouriſhing food.

CASSIA, *Caryophyllata*, the bark of a tree of the clove kind, brought from the iſland of Cuba, Jamaica, and other parts of the Weſt-Indies; rolled up in quills, like cinnamon, but ſomewhat thinner, rougher on the outſide, and of a darker ruſty brown colour.

This bark is a warm aromatic, nearly of the ſame kind of ſmell and taſte with the clove ſpice, but weaker, and with a little admixture, as it were, of the cinnamon flavour. It agrees nearly with cloves alſo in regard to the ſolubility and volatility of its active principles. Tinctures of it in rectified ſpirit, ſmell and taſte ſtrongly of the bark: the watery infuſions are conſiderably impregnated with its ſmell, but have very little of its taſte. On inſpiſſating the ſpirituous tincture, the ſpirit which diſtils has little or nothing of its flavour: the remaining extract ſmells lightly of the bark, and proves in taſte very hot and pungent, though much leſs ſo than the ſpirituous extract of cloves. In diſtillation with water, it yields a very ſmall portion of eſſential oil, nearly ſimilar in flavour to oil of cloves, but more pungent than the genuine oil of that ſpice: the remaining decoction is ungratefully auſtere and bitteriſh.

A bark of the ſame kind is ſometimes brought from the Eaſt-Indies under the name of culitlawan, or culilawan, a Malaccan compound word, of which the Latin *cortex caryophyloides*, or clove bark, is ſaid to be a tranſlation. That diſtinguiſhed in Europe by the name of calilawan, is thicker than the other, and in colour approaches ſomewhat more to cinnamon, but ſcarcely differs in ſmell or taſte.

The ſame with this appears likewiſe to be the carabaccium of Baglivi; which he deſcribes as being in taſte like cloves, but very temperate and grateful, and in colour having a great reſemblance to cinnamon; and which, he ſays, he made uſe of with great benefit in decoction, for correcting the acrimony and ſcorbutic diſſolution of the lymph, and for ſtrengthening the ſtomach and promoting digeſtion.

Rumphius obſerves, that the outer and inner barks, and the barks of different parts of the tree, differ ſomewhat in colour and in taſte from one another; whence, probably, ſuch differences as may have been obſerved in thoſe brought under different names into Europe; and that the bark of the root approaches both in appearance and in flavour to ſaſſafras, for which it was, in Batavia, frequently ſubſtituted.

Cassia *Fiſtularis*, a hard woody cylindrical pod of a tree reſembling the walnut, which grows ſpontaneouſly in Egypt and the warmer parts of the Eaſt-Indies, and has been thence introduced into the Weſt.

The pods or canes are about an inch in diameter, and a foot or more in length; externally, of a dark brown colour, ſomewhat wrinkled, with a large ſeam running the whole length upon one ſide, and another leſs viſible on the oppoſite one; internally, of a pale yellowiſh colour, divided by thin tranſverſe woody plates into a number of little cells, containing each a flattiſh oval ſeed, with a ſoft black pulp.

The pulp of caſſia has a ſweetiſh taſte, followed by more or leſs of an ungrateful kind of acrimony. The caſſia of the Eaſt-Indies has a more agreeable ſweetneſs, and leſs acrimony than that of the Weſt; and hence the former is univerſally preferred: they may be diſtinguiſhed from one another by the eye; the oriental canes being ſmaller, ſmoother, and thinner rined, and their pulp of a deeper ſhining black colour than the occidental. The lighter canes of either ſort, and thoſe in which the ſeeds rattle on being ſhaken, are generally rejected: in theſe, indeed, the pulp has become dry, but it does not neceſſarily follow that it is damaged: it loſes nothing in drying but its aqueous humidity; and by this loſs it ſhould ſeem to be effectually ſecured from growing mouldy or ſour, inconveniences to which in its moiſt ſtate it is very ſubject.

The pulp of caſſia, whether moiſt or dry, diſſolves both in water and in rectified ſpirit; readily in the former, ſlowly and difficultly in the latter, and not totally in either: the part which remains undiſſolved appears to be of little or no activity. It is uſually extracted by boiling the bruiſed pods in water, and evaporating the ſtrained ſolution to a due conſiſtence: the exhaling vapour carries off nothing conſiderable of the caſſia. As it is very apt to grow ſour in keeping, only ſmall quantities ſhould be prepared at a time.

Caſſia, in doſes of a few drams, is a gentle laxative; of good uſe in coſtive habits, in inflammatory caſes where purgatives of the more acrid or irritating kind can have no place; and, as Geoffrey obſerves, in the painful tenſion of the belly which ſometimes follows the imprudent uſe of antimonials. It is rarely given in ſuch doſes as to have the full effect of a cathartic; the quantity neceſſary for this purpoſe, an ounce and a half or two ounces, being apt to nauſeate the ſtomach, and produce flatulencies and gripes, eſpecially if the caſſia is not of a very good kind: mild aromatics, and dilution with warm liquors, are the beſt correctives.

It is ſometimes actuated with the ſtronger purgatives, or with the antimonial emetics; of which laſt it is ſaid by ſome to diminiſh the activity ſo far, that four grains and a half of the tartarum emeticum may be taken in a decoction of caſſia, by thoſe who can bear but one grain and a half of the antimonial preparation by itſelf. It is often joined alſo as an auxiliary to the milder purgatives, as cryſtals of tartar, tamarinds, and manna; and of theſe, particularly of the latter, it is ſuppoſed to increaſe the cathartic virtue; a mixture of four drams of caſſia and one and a half or two of manna, being ſaid to purge as much as twelve drams of caſſia or thirty-two of manna by themſelves.

It is obſervable, that during the uſe of caſſia, the urine appears frequently of a green colour, and ſometimes, where the quantities taken are conſiderable, of a dark brown or blackiſh.

Caſſia *Lignea*, the bark of a tree of the cinnamon-kind, brought from the Eaſt-Indies; exactly reſembling cinnamon in appearance, but diſtinguiſhable by its breaking ſhort or ſmooth, while cinnamon breaks fibrous or ſhivery, like wood.

This bark reſembles cinnamon in aromatic flavour as well as in external appearance; but differs in being weaker, or containing leſs active matter, and in its abounding with a viſcous mucilaginous ſubſtance. Chewed, it diſſolves as it were in the mouth into a kind of ſlime: powdered and boiled in water, it renders a conſiderable quantity of the fluid thick and glutinous, ſo as to concrete on cooling into the conſiſtence of a jelly.

Rectified ſpirit of wine, digeſted on the bark, diſſolves and extracts its aromatic matter; the powder retaining its mucilage, ſo as to form a jelly with water as at firſt. The aromatic part may be ſeparated alſo by diſtillation with water; in which proceſs, if a large quantity of caſſia is uſed, a ſmall portion of eſſential oil may be collected. The ſpicy principle of the caſſia, thus freed from the mucilage, in the form of ſpirituous tincture, or ſpirituous extract, or diſtilled water, or eſſential oil, appears the ſame with that of cinnamon; provided, in regard to the diſtilled fluids, that they have not received an empyreumatic taint in the operation, an inconvenience to which they are very ſubject on account of the mucilaginous matter ſwelling up and burning to the veſſel.

Caſſia lignea was employed by the ancients as a ſuccedaneum to cinnamon, of which it was reckoned equivalent to half its own quantity. At preſent it is not unfrequently mixed with that ſpice in the ſhops, but is ſcarcely ever made uſe of under its own name. *Lewis's Hiſtory of the Materia Medica.*

CASSINE, the caſſia-berry-tree, in botany, a genus of plants, the flower of which is patent, divided into five ſuboval, obtuſe ſegments larger than the cup; the fruit is a roundiſh berry with three cells, containing ſolitary ſuboval ſeeds. This plant is uſed in South America in the ſame manner as tea.

CASSIOPEIA, in aſtronomy, a conſtellation of the northern hemiſphere, ſituated oppoſite to the great bear on the other ſide of the pole. The ſtars of this conſtellation, in Ptolemy's catalogue, are thirteen; in Tycho's twenty-eight; and in Mr. Flamſtead's fifty-ſix.

In the year 1572, a remarkable new ſtar appeared in this conſtellation, ſurpaſſing Sirius or Lyra in brightneſs and magnitude. It appeared even bigger than Jupiter, which at that time was near his perigee, and by ſome was thought equal to Venus, when ſhe is in her greateſt luſtre; but in a month it began to diminiſh in luſtre, and in about eighteen months entirely diſappeared.

CASSITERIA, in the hiſtory of foſſils, a genus of cryſtals, the figures of which are influenced by an admixture of ſome particles of tin.

The caſſiteria are of two kinds: the whitiſh pellucid caſſiterion, and the brown caſſiterion; the firſt is a tolerably bright and pellucid cryſtal, and ſeldom ſubject to the common blemiſhes of cryſtal. It is of a perfect and regular form, in the figure of a quadrilateral pyramid; and is found in Devonſhire and Cornwall principally. The brown caſſiterion is like the former in figure: it is of a very ſmooth and gloſſy ſurface; and is alſo found in great plenty in Devonſhire and Cornwall.

CASSOCK, or Cassula, a kind of robe or gown, wore over the reſt of the habit, particularly by the clergy.

The word caſſock comes from the French, *caſaque*, an horſeman's coat; ſome derive that again from the garment of the Coſſacs.

CASSOWARY, in ornithology, makes a diſtinct genus of birds, of the order of the gallinæ; the characters of which are theſe: its feet have each three toes, all placed forward; and its head is ornamented with a kind of bony comb and naked wattles.

There is only one ſpecies of this genus, which is a robuſt, large, and thick bird, meaſuring four feet and an half when it ſtretches out its neck.

CASSMUNAR, in the materia medica, is the root of an Eaſt-India plant, of which we have no certain account; brought over in irregular ſlices of various forms, ſome cut tranſverſely and others longitudinally: the cortical part is marked with circles, and of a duſky browniſh colour: the internal part is paler, and unequally yellow.

This root was introduced ſome time ago by Marloe, as a medicine of uncommon efficacy in hyſteric, epileptic, paralytic, and other nervous diſorders. At preſent it is ſometimes employed as a ſtomachic; but its uſe is not yet become ſo general as it ſeems to deſerve. It is an elegant mild aromatic, moderately warm, lightly bitteriſh; in ſmell ſomewhat reſembling ginger. Its virtues are extracted in perfection by rectified ſpirit, and, on drawing off the menſtruum from the filtered tincture, remain concentrated in the inſpiſſated maſs, which ſmells very agreeably, and impreſſes on the organs of taſte a grateful bitteriſhneſs, and a durable glowing warmth, not a fiery or pungent heat. Both the tincture and extract are of a deep ſaffron colour. *Lewis's Hiſtory of the Materia Medica.*

CASTANEA, the cheſnut-tree, in botany, a genus of trees, whoſe characters are: the flower is of the amentaceous kind, being compoſed of a number of ſtamina, ariſing from a five-leaved cup, and fixed to a ſlender capillament, or axis. Theſe are the male flowers, but the fruit grows on other parts of the tree; theſe are roundiſh, echinated, and open into four parts, and contain cheſnuts with their kernels.

M. Tournefort has enumesated four, and Mr. Miller five ſpecies of caſtanea.

Theſe trees are propagated by planting them in February, in beds of freſh, undunged earth: the beſt nuts for ſowing are ſuch as are brought from Portugal and Spain, and are commonly ſold in winter for eating, provided they are not kiln-dried, which is generally the caſe of thoſe brought from abroad, which is done to prevent their ſprouting or rooting in their paſſage; therefore, if they cannot be procured freſh from the tree, it will be much better to uſe thoſe of the growth of England, which are full as good to ſow, for timber or beauty, as any of the foreign nuts, though their fruit are much ſmaller; theſe ſhould be preſerved until the ſeaſon for ſowing, in ſand, where mice, or other vermin, cannot come to them, otherwiſe they will ſoon deſtroy them. Before you ſet them, it will be proper to put them into water, to try their goodneſs, which is known by their ponderoſity; thoſe of them that ſwim upon the ſurface of the water ſhould be rejected, as good for nothing; but ſuch as ſink to the bottom you may be ſure are good.

In April theſe nuts will appear above ground; you muſt, therefore, obſerve to keep them clear from weeds, eſpecially while young: in theſe beds they may remain for two years, when you ſhould remove them into a nurſery, at a wider diſtance. The beſt ſeaſon for tranſplanting theſe trees is either in October, or the latter end of February; but October is the beſt ſeaſon: the diſtance they ſhould have in the nurſery, is three feet, row from row, and one foot in the rows.

After having remained three or four years in the nurſery, they will be fit for tranſplanting, either in rows, for avenues to a houſe, or in quarters, for wilderneſs plantations; but if you intend them for timber, it is much the better method to ſow them in furrows, as is practiſed for oaks, &c. and let them remain unremoved; for theſe trees are apt to have a downright tap root, which being hurt by tranſplanting, is often a check to their upright growth, and cauſes them to ſhoot out into lateral branches, as is the caſe with the oak, walnut, &c.

CASTANET, a muſical inſtrument of the pulſative kind, wherewith the Moors, Spaniards, and Bohemians, accompany their dances, ſarabands, and guitars, ſerving only to direct the time.

It conſiſts of two little round pieces of wood, dried and hollowed, in the manner of a ſpoon; the concavities whereof are placed one on another, faſtened to the thumb, and beat, from time to time, with the middle finger, to direct their motions and cadences: they may beat eight or nine times in the ſpace of a meaſure, or ſecond of a minute.

CASTELLAN, the name of a dignity or charge in Poland: the caſtellans are ſenators of the kingdom, but ſenators only of the lower claſs, who, in diets, ſit on low

ſeats,

CARDIALGIA, in phyſic, a pain at the mouth of the ſtomach, or heart-burn.

The word is formed from καρδια, the heart, or rather the left orifice of the ſtomach, and αλγειν, to burn.

The cardialgia is none of the leaſt evils incident to mankind, but of the nature of thoſe diſorders which affect the mind as well as the body; nor is it a pain of the heart, as it is commonly reckoned, but of the ſtomach, which is a very nervous part, and of exquiſite ſenſation, and principally affects its orifices, being ſeated near the pit of the ſtomach, and very pungent, attended with great anxiety, difficulty of breathing, loſs of ſtrength, reſtleſſneſs, ſtrainings to vomit, trembling and coldneſs of the extreme parts, and a ſlight lipothymy, and owing its original to a convulſion or inflation, and frequently communicating its ill effects, by conſent of parts, to the whole nervous ſyſtem.

The curative intentions are, firſt to temper and correct the peccant matter lodged about the ſtomach, and to remove it by proper diſcutients, or proper evacuants. Secondly, to alleviate and ſooth the violent pains, which ſurpriſingly impair the ſtrength, leſt an inflammation ſhould ſucceed. Thirdly, to have a due regard to the primary and original diſeaſe, if the diſorder be ſymptomatical. Fourthly, to reſtore and confirm the tone of the ſtomach and inteſtines, which have been weakened by the violence of the pains and ſpaſms, by proper remedies.

The heart-burn is uſually cauſed either by an alcaline or an acid acrimony prevailing in the ſtomach. If by a redundant acid, which is moſt generally the caſe, alcaline ſubſtances will cure the preſent diſorder, as teſtaceous powders, or a clove chewed in the mouth, and ſwallowed gradually: but if the diſorder proceeds from an alcali, the cure will conſiſt in exhibiting aceſcent ſubſtances.

Galen recommends vinegar of ſquills, as a moſt effectual remedy for preventing the heart-burn: but Hippocrates, in the ſecond of his Epidemics, orders hot bread with pure wine, to be given in this diſorder.—— Perhaps the beſt medicine yet known for this diſeaſe, when it proceeds from an acid acrimony, is the magneſia alba.

CARDINAL, in a general ſenſe, an appellation given to things on account of their pre-eminence: thus we ſay, cardinal winds, cardinal virtues, &c.

CARDINAL VIRTUES are theſe four, juſtice, prudence, temperance, and fortitude, upon which all the reſt depend.

CARDINAL POINTS, in coſmography, are the eaſt, weſt, north, and ſouth. See the article POINT.

CARDINAL WINDS, thoſe that blow from the cardinal points.

CARDINAL SIGNS, in the zodiac, are Aries, Libra, Cancer, and Capricorn.

CARDINAL, an eccleſiaſtical prince, in the Romiſh church, being one who has a voice in the conclave at the election of a pope.

The cardinals were originally nothing more than deacons, to whom was intruſted the care of diſtributing alms to the poor of the ſeveral quarters of Rome, whence they were called *Diaconi Regionarii*; and as they held aſſemblies of the poor in certain churches of their ſeveral diſtricts, they took the name and title of thoſe churches. They began to be called cardinals during the pontificate of St. Sylveſter; an appellation derived to them from the cardinal prieſts, in the primitive church, being the chief prieſts of a pariſh, and next in dignity to the biſhop. Afterwards this office grew much more conſiderable, and by ſmall degrees arrived at its preſent height, in which it is the reward of ſuch as have ſerved the church and his holineſs well; even princes thinking it no diminution of their honour to become members of the college of cardinals.

The cardinals compoſe the pope's council, or ſenate; and there is, in the Vatican, a conſtitution of pope John, which declares, that as the pope repreſents Moſes, ſo the cardinals repreſent the ſeventy elders. It was pope Pius IV. who firſt decreed that the pope ſhould be choſen only by the college of cardinals; though ſome carry up this right as high as Nicolas II. in 1058. The cardinals began to wear the red-hat, at the council of Lyons, in 1243. Till the time of Urban VIII. they were ſtyled only Moſt Illuſtrious: afterwards, by a decree of that pope, they had the title of Eminence given them.

At the creation of a new cardinal, the pope performs the ceremony of ſhutting and opening his mouth, which is done in a private conſiſtory. The ſhutting his mouth ſignifies the depriving him of the liberty of giving his opinion in conſiſtories and congregations; and the opening of his mouth, which is performed fifteen days after, implies the taking off this reſtraint. If the pope happens to die, during the time a new cardinal's mouth is ſhut, he can neither give his voice in the election of a new pope, nor be himſelf promoted to that dignity.

When his holineſs has reſolved to make a new promotion of cardinals, he calls a private conſiſtory, in which he declares his intention to all the cardinals preſent, and names to them the perſons he intends to honour with the red-hat: he then gives them eight or ten days to conſider of it; at the expiration of which, he calls another conſiſtory, in which he takes the opinion of each cardinal, who have all full and entire liberty of giving their voice pro or con.

The cardinals are divided into ſix claſſes, or orders, conſiſting of ſix biſhops, fifty prieſts, and fourteen deacons, making in all ſeventy; which conſtitute what they call the ſacred college. The number of cardinal-biſhops has been always the ſame; but that of cardinal-prieſts and deacons is not fixed. Till the year 1125, the college conſiſted of fifty-two or fifty-three. The council of Conſtance reduced them to twenty-four, and Sixtus IV. raiſed them again to fifty-three. The ſix cardinal biſhops are thoſe of Oſtia, Porro, Sabina, Paleſtrina, Fraſcati, and Albano.

The privileges of the cardinals are very great: they have an abſolute power in the church during the vacancy of the holy-ſee: they have a right to elect the new pope; and are the only perſons on whom the choice can fall. Moſt of the grand offices in the court of Rome are filled by cardinals.

The dreſs of a cardinal is a red ſoutanne, a rochet, a ſhort purple mantle, and the red-hat. When they are ſent to the courts of princes, it is in quality of legates *a latere*; and when they are appointed governors of towns, their government is called by the name of legation. There are five legations, viz. thoſe of Avignon, Ferrara, Bologna, Ravenna, and Perugia.

F. Paul obſerves, that "The name of cardinal, originally derived from a very low and abject condition, is, by a change of ſignification, become a title ſo elevated, that cardinals are now ſaid to be *quaſi cardines omnium terrarum*;" that is, the hinges or axis on which the government of the univerſal church turns.

CARDING, the combing and preparing of wool, cotton, flax, &c. with the inſtruments called cards. See CARD.

Before wool be carded, it muſt be greaſed with oil, of which one fourth part of the weight of the wool is required for that which is deſigned for making the woof of ſtuffs, and the eighth part for that of the warp.

CARDIOID, in geometry, is thus formed: let the diameter A B (plate XXXV. *fig.* 1.) of the circle A M B A, revolve about the point A; and, A B produced, let B a M N, A D, M N, &c. be always equal to A B; then will the point a deſcribe a curve, which, from its figure reſembling a heart, is called cardioid.

From the conſtruction it appears that A N $=$ B A $+$ A M, and that N A N is always double of the diameter A B, and is biſected by the circle in M.

This curve is algebraical; if $AB=a$, $aE=x$, $EN=y$, its equation will be, $y^4-6ay^3+12x^2y^2-6ax^2y+x^4=0+12a^2y^2-8a^3y+3a^2x^2$.

CARDIOSPERMUM, in botany, a genus of plants, the flower of which conſiſts of four petals, and is cruciform; the fruit is a roundiſh trilocular capſule, containing a ſingle cordated ſeed.

CARDO, in anatomy, a name given to the ſecond vertebra of the neck.

CARDUUS, the thiſtle in botany, a genus of plants, the compound flower of which is tubulous and uniform;

the proper flower is monopetalous, of a funnel form, with a very ſmall tube and erect limb, and divided into five linear equal ſegments. There is no pericarpium; but the cup is a little connivent, and contains ſolitary, vertically-ovated, quadrangular ſeeds, with two oppoſite angles obliterated, and crowned with a very long down.

Carduus *Benedictus*, holy thiſtle, a plant with rough, narrow, jagged leaves, terminating in ſoft prickles; and large, hairy, branched ſtalks, leaning to the ground; on the tops of which grow large, ſcaly, prickly heads, including a number of yellow floſculi, which are followed by oblong ſtriated ſeeds, incloſed in down. It is a native of Spain, and ſome of the iſlands of the Archipelago; and ſown annually with us in gardens.

The leaves of carduus have a penetrating bitter taſte, not very ſtrong, or very durable in the mouth; accompanied, in their recent ſtate, with ſomewhat of an ungrateful flavour, which they ſoon loſe in keeping. The herb, when thoroughly dried, ſhould be hung up looſely in an airy place, being very ſubject, if preſſed cloſe, to rot or grow mouldy.

Cold water, poured on the dry leaves, extracts, in an hour or two, a light grateful bitterneſs: by ſtanding long upon the plant, the liquor becomes diſagreeable: a ſtrong decoction is very nauſeous and offenſive to the ſtomach. A cold infuſion and a decoction being ſeparately inſpiſſated, the ſame differences were obſerved between the extracts, as between the liquors in their dilute ſtate; that left by the infuſion being a ſufficiently agreeable bitter, and that by the decoction diſguſtful; a proof that the differences of the liquors do not depend, as might be ſuppoſed, on their degree of ſaturation, but on their being impregnated with matters of a different kind.

Rectified ſpirit alſo extracts, in a ſhort time, the lighter bitter parts of the carduus, but does not take up the nauſeous near ſo eaſily as water: a ſpirituous tincture prepared by warm digeſtion for ſeveral hours, and the extract obtained by inſpiſſating it, were more ſtrongly but not unpleaſantly bitter. The colour of the watery tinctures is a yellowiſh or greeniſh, inclining more or leſs to brown, according as they are more or leſs ſaturated; that of the ſpirituous, a deep green.

On keeping the ſoft watery extracts for ſome months, a conſiderable quantity of ſaline matter was found to have ſhot upon the ſurface into ſmall cryſtals, in ſhape approaching to thoſe of nitre, in taſte bitteriſh, with an impreſſion of coolneſs.

The virtues of this plant ſeem to be little attended to in the preſent practice. The nauſeous decoction is ſometimes uſed to excite vomiting, and a ſtrong infuſion to promote the operation of other emetics: but this elegant bitter, when extracted from the offenſive parts of the herb, may be advantageouſly applied to other purpoſes. We have frequently obſerved excellent effects from a light infuſion of carduus, in weakneſs of appetite and indigeſtion, where the ſtomach was injured by irregularities, and oppreſſed by viſcid phlegm: nor have we found any one medicine of the bitter kind to ſit ſo eaſily on weak ſtomachs, or to heat ſo little. Theſe infuſions, taken freely, promote the natural ſecretions: drank warm in bed, they commonly increaſe perſpiration or excite ſweat; and as they act with great mildneſs, not heating or irritating conſiderably, they have been uſed, in this intention, in acute as well as chronical diſeaſes.

The ſeeds of carduus are likewiſe conſiderably bitter, and have ſometimes been uſed as ſudorifics or diaphoretics, in the form of an emulſion. Cartheuſer obſerves, that they give the proper conſiſtence of an emulſion to ten times their weight or more of water; and that they do not impart a perfect whiteneſs, but a greyiſh colour to the liquor.

Carduus Fullonum, a name by which the dipſacus, or teazel, is ſometimes called. See the article Dipsacus.

CAREENING, in naval affairs, heaving the ſhip down on one ſide by a ſtrong purchaſe applied to her maſts, which are properly ſupported for the occaſion, to prevent their breaking with ſo great a ſtrain.

Careening is uſed to heave the ſhip's ſide ſo low in the water that her bottom, being elevated above its ſurface on the other ſide, may be cleaned of any filth which adheres to it during a long voyage, as ſhells, ooze, ſea-weed, &c.

This is performed by applying flaming faggots, furze, or other ſuch materials to the bilge; and the fire, thus catching on the tar, pitch, or other ſtuff, which had formerly been laid on the bottom to preſerve it, continues burning till all the excrement is looſened and falls off from the bottom; after this it is covered with a compoſition of tallow, ſulphur, turpentine, &c. and one ſide being cleaned in this manner, the other is heaved out for the ſame purpoſe. When a ſhip is laid on a careen, every thing is taken out of her: a ſhip is alſo ſaid to careen when ſhe lies down at ſea, as preſſed with a weight of ſail.

CARET, among grammarians, a character marked thus ‸, ſignifying that ſomething is added on the margin, or interlined, which ought to have come in where the caret ſtands.

CAREX, in botany, a genus of plants: in the male flower there is no corolla; in the female there are no petals; but the nectarium is of an ovato-oblong form, inflated, bidentated at the top: there is no pericarpium; but the nectarium, growing large, contains a ſingle ovato-acute triquetrous ſeed, with one of its angles leſs than the reſt.

CARGO, in naval affairs, the merchant-goods of whatever ſort with which a ſhip is freighted, and proceeds from port to port.

CARIA, in zoology, a ſpecies of ant, common in the Eaſt-Indies, and larger than thoſe with us.

They are very miſchievous, living in large communities, and throwing up hills of earth five or ſix feet high.

CARICA, in botany, a genus of plants, the male flower of which is monopetalous, of a funnel-form, with a limb divided into five lanceolato-linear, obtuſe, obliquely ſpiral ſegments; the female flower is pentapetalous, the petals being lanceolato-linear, obtuſe on both ſides, very long, erect below the middle, but above the middle bending outwards and downwards: the fruit is a very large berry, angulated with five furrows, having one cell, and containing numerous, ovated, ſulcated, and tunicated ſeeds.

CARIES, in ſurgery, is properly a diſorder in which the bone, from whatever cauſe, is deprived of its perioſteum; and having loſt its natural heat and colour, becomes fatty, yellow, brown, and at length black; this is the firſt and lighteſt degree of the diſorder, and is what, according to Celſus, the ancients called *os vitiatum*, and the *nigrities oſſium*. But the greater degree of this diſorder is where the bone is eroded and eaten, and becomes uneven by reaſon of the number of ſmall holes of which it is full, when it diſcharges a filthy ſanies, whoſe acrimony ſoftens, relaxes, and deſtroys the fleſhy parts that grow round it. This is a true caries or ulcer of the bone; and every bone of the body is ſubject to this diſorder; and though this ulcer may appear to be ever ſo ſafely or happily healed, yet it too often happens, that after the cicatrix is formed, and has been ſo for ſome time, a new abſceſs will be made, the whole diſorder will return afreſh, and the acrimonious and corrupted matter, which continually iſſues out from the various bones, being collected within, will produce many grievous ſymptoms, and deſtroy the neighbouring fleſh again.

There have been many names, and many ſpecies reckoned of this diſorder, and of others that are of kin to it; it is called a caries, a ſpina ventoſa, a ſpinæ ventoſitas, a gangrene, and cancer of the bone by Celſus, ſometimes by the Greek term, teredo, and ſometimes pædarthrocaces. Some authors conſtitute as many ſpecies of this diſorder, as there are here accounted names of it; but there is ſo ſmall a difference between theſe, that it will not warrant the making of them ſo many ſpecies: they may very properly, however, be divided into two kinds, the one when the diſorder begins in the internal part of the bone, the other when it begins on the outſide, or from an external cauſe. This may be called a caries, and that a ſpina ventoſa; or, where it happens in children, according to Severinus, a pædarthrocaces.

There are two principal cauſes of a caries of the bones; the one where the bone is deprived of its perioſteum by a wound, fracture, or other accident, and is corrupted, either by being expoſed to the external air, or heated with greaſy dreſſings; the other where the fluids are interrupted in their circulation by any external violence, or internal cauſe whatſoever; from whence an inflammation and ſuppuration ſucceed, and the bone and perioſteum ſuffer to ſuch a degree, that the veſſels, which are ſent to the part for its nouriſhment and ſupport, being inflamed and corrupted, the bone is brought into conſent, and quickly becomes carious: this diſorder, if not quickly remedied, ſpreads and communicates itſelf to the neighbouring parts of the bone, and makes the ſame progreſs as ulcers do in the ſofter parts. There are, therefore, ſeveral degrees of the caries of the bones; the firſt is when the bone is laid bare, looks greaſy, and turns yellowiſh: as ſoon as it becomes thoroughly yellow, brown, or black, the incipient caries then degenerates into a worſe ſtate. The third degree is when the bone becomes uneven, rough, and rotten; and the greater eroſion the bones have ſuffered, the more rough and uneven they will appear. When the cranium is perforated through both its tables, or the tibia or femur are eaten through to the marrow, this is a caries of a very bad kind; but the worſt of all caries, and that in which the caſe may indeed be almoſt pronounced deſperate, is that which falls upon the joints, or thoſe parts of the bones which lie very deep, becauſe in this caſe there is no acceſs for the hands to clean the bone, and there is no remedy but the amputating the limb.

Many methods have been attempted for the cure of a caries; the firſt and mildeſt is applied to the ſlighteſt degree of the diſeaſe, and is performed by the application of ſpirituous remedies, ſuch as ſpirit of wine, Hungary-water; or by ſlight balſamics, ſuch as the powder of birthwort, florentine iris, myrrh, or aloes. Either of theſe powders is to be ſprinkled on the part, after the ſanies has been carefully wiped away with dry lint, and this continued till the cure is perfected. In a caries that penetrates ſomewhat deeper, ſtronger remedies take place, ſuch as powder of euphorbium, or its eſſence, made in well rectified ſpirit of wine; or oil of cloves, cinnamon, or guaiacum; either of theſe may be touched on with a pencil, or laid upon dry lint, and applied: ſome alſo uſe the corroſive medicines, the phagadenic water, and ſpirit of vitriol, or of ſulphur; and, in the place of theſe, a ſolution of quick-ſilver in aquafortis may be uſed with great ſucceſs. When by theſe means an exfoliation of the bone has been produced, the buſineſs is then to treat it with balſamics.

A ſecond method of cure for a greater degree of caries is perforating the bone with the trepan, and dreſſing the part afterwards, either with balſamics, or dry lint. By theſe means the exfoliation of the bone is forwarded, and new veſſels puſh themſelves thro' the foraminula, which, joining with the neighbouring fleſh, make a new covering for the bone.

The third method of cure is performed by the raſpatory, or chiſſel, taking off the corrupted or vitiated part of the bone, till all beneath appears white, or ruddy, and ſound: and the fourth, which is the moſt ancient, and the moſt ſpeedy and certain method, is by the actual cautery, burning down the moſt vitiated part of the bone. This method, however, is not neceſſary, except in great degrees of this diſorder; and in the performing it, great care muſt be taken not to injure the neighbouring ſoft parts. For this reaſon an aſſiſtant ſhould always draw back the lips of the wound both ways, while the operation is performed; and if the opening be not wide enough, it ſhould be previouſly opened and enlarged by ſponge tents, or widened by the knife, till the bone lies fair, when the part muſt be carefully wiped with dry lint, to cleanſe it from the ſanies; and if there be any fungous fleſh, that muſt be alſo removed.

One application of the cautery, when the diſorder is conſiderable, will ſeldom prove ſufficient; it uſually requires to be repeated ſeveral times, at proper intervals; and if the caries be of ſuch extent that one cautery will not cover it all over, the firſt muſt be applied to the middle, and the ſucceeding towards its edges. This operation is not attended with any great pain, if care be taken not to injure any of the adjacent ſoft parts; for the bones are in themſelves free from any ſenſe of pain. Where the cranium is the ſeat of this diſorder, the cautery is attended with great hazard, as it is alſo in a caries of the ribs, or ſternum, from the neighbourhood of parts of the utmoſt conſequence to life. The carpus and tarſus alſo will very badly admit of cauterizing, becauſe of the neighbourhood of the tendons and ligaments, which it is ſcarce poſſible to avoid injuring in the operation. After cauterizing the part, it is to be dreſſed with dry lint only, or if the patient complain of great heat in the part, the lint may be dipped in ſpirit of wine before it is applied: afterwards balſamics are to be applied till the part exfoliate, and then, if the cure be perfect, the vacuity will ſoon be filled with new ſound fleſh. But if the bone remains bare, or the fleſh it is covered with be ſoft and ſpongy, and does not adhere ſufficiently to the ſubjacent bone, or where the bone remains diſcoloured, in either of theſe caſes the cure will not ſtand, but the diſorder will break out again, unleſs prevented. In theſe caſes therefore the work muſt be all done over again, the ſpongy fleſh removed, and the actual cautery again applied, otherwiſe the cure can never ſtand. *Heiſter's Surgery.*

CARINA properly ſignifies the keel of a ſhip. See the article KEEL.

CARINA, in architecture, a name given by the Romans to all buildings in the form of a ſhip, from carina, the keel of a ſhip, as we ſtill uſe the word nave for *navis*, a ſhip, the middle or principal vault of our churches, becauſe it has that figure.

CARINA, in anatomy, a term uſed for the fibrous rudiments or embryo of a chick, appearing in an incubated egg.

The carina conſiſts of the entire vertebræ, as they appear after ten or twelve days incubation.

CARINA, in botany, the loweſt petal of a papilionaceous flower. See the article PAPILIONACEOUS.

CARIOUS, ſomething partaking of the nature of a caries. See CARIES.

CARLINA, the Carline thiſtle, in botany, a genus of plants, with long, narrow, deeply jagged, and very prickly leaves, lying on the ground; in the middle of which grows a large roundiſh head, without any ſtalk, encompaſſed with ſmaller leaves, full of ſharp prickles: the flower iſſues from the middle of the head.

It is a native of the mountainous parts of Italy and Germany, from whence the dried roots are ſometimes brought to us. Theſe are about an inch thick, externally of a ruſty or reddiſh brown colour, internally of a pale yellowiſh or browniſh, corroded as it were upon the ſurface, and perforated with ſmall holes, ſo as to appear, when cut, as if worm-eaten.

The roots of Carline thiſtle have a moderately ſtrong, not agreeable ſmell, and a weak, bitteriſh, ſubacrid, ſomewhat aromatic taſte. Infuſions of them in water have a very little taſte, and not much ſmell: diſtilled with water, they yield one two-hundredth part of their weight, or a little more, of a thick ponderous eſſential oil, which, on being rectified or re-diſtilled, leaves a conſiderable proportion of reſinous matter, and becomes thin: the decoction remaining after the ſeparation of this moſt active principle of the root, is unpleaſantly bitteriſh, and ſubſaline, though only weakly ſo, even when inſpiſſated. A tincture and extract prepared with rectified ſpirit are ſtronger in taſte than thoſe made with water, but have little ſmell. Both the watery infuſion and extract are of a browniſh yellow colour, the ſpirituous of a deep gold yellow.

This root is ſuppoſed to be diaphoretic, antihyſteric, and anthelmintic. It has been greatly eſteemed by foreign phyſicians, in acute malignant as well as in chronical diſeaſes; and given in ſubſtance from a ſcruple to a dram, and in infuſion from one to two drams and more. It never came much into uſe among us, and is now rarely to be met with in the ſhops. Frederic Hoffman the elder relates, that he has known a decoction of it in broth excite vomiting, but does not mention the quantity which produced this effect.

CARLINE, or CAROLINE, a ſilver coin current in the Neapolitan dominions, and worth about four-pence of our money.

CARLINGS, in naval architecture, ſhort pieces of ſquare timber ranging fore and aft, or lengthwiſe, between the beams of a ſhip, into which they are ſcored.

CARMELITES, or WHITE-FRIARS, are an order of our Lady of Mount Carmel, making one of the four orders of mendicants. They pretend to derive their original from the prophets Elijah and Eliſha. Their original rules contained ſixteen articles, one of which confined them to their cells, and enjoined them to employ themſelves day and night in prayer; another prohibited the brethren having any property; another enjoined faſting, from the feaſt of the exaltation of the holy-croſs till Eaſter, excepting on Sundays; abſtinence at all times from fleſh was enjoined by another article; one obliged them to manual labour; another impoſed a ſtrict ſilence on them, from veſpers till the tierce the next day: however, theſe conſtitutions have been in ſome reſpects altered.

This order is ſo much increaſed, that it has at preſent thirty-eight provinces, beſides the congregation of Mantua, in which there are fifty-four monaſteries, under a vicar-general, and the congregation of bare-footed Carmelites in Italy and Spain, which have their peculiar generals.

If a monk of this order lie with a woman, he is prohibited ſaying maſs for three or four years, is declared infamous, and obliged to diſcipline himſelf publicly once a week: if he is again guilty of the ſame offence, his penance is doubled: and if a third time, he is expelled the order.

CARMINATIVES, in pharmacy, are medicines appropriated to expel wind.

A great many ſeem to be ſtrangers to this term; as it does not appear to carry in it any thing expreſſive of the medicinal efficacy of thoſe ſimples which paſs under its denomination. This term had certainly its riſe, when medicine was too much in the hands of thoſe jugglers, who, for want of true knowledge in their profeſſion, brought religion into their party; and what through their ignorance they were not able to do by rational preſcription, they pretended to effect by invocation and their intereſt with heaven: which cant being generally, for the ſurprize ſake, couched in ſome ſhort verſes; the word *carmen*, which ſignifies a verſe, was uſed alſo to mean an enchantment; which was frequently made uſe of to ſatisfy the people of the operation of a medicine they could not account for. And as thoſe medicines now under this name, are of quick efficacy, and the conſequences thereof, in many inſtances, ſurpriſing; and the moſt violent pains, ſometimes ariſing from pent-up wind, immediately ceaſing upon its diſperſion; ſuch medicines as give relief, in this caſe, are more properly termed carminatives, as if they cured by enchantment.

How they expel wind may be conceived, when we conſider that all the parts of the body are perſpirable. Sanctorius, in his Medicina Statica, determines all we call wind in the bowels to be ſuch perſpirable matter as makes its eſcape through the coats of the ſtomach and inteſtines. Between the ſeveral membranes likewiſe of the muſcular parts may ſuch matter break out, and lodge for ſome time. Now whatſoever will rarefy and render ſuch collections of vapour thinner, muſt conduce to their utter diſcharge out of the body; and conſequently remove thoſe uneaſineſſes which ariſe from their detention. And as all thoſe things that paſs under this denomination are warm, and conſiſt of very light ſubtile parts, it is eaſy to conceive how a mixture of ſuch particles may agitate and rarefy thoſe flatulencies, ſo as to facilitate their expulſion; eſpecially conſidering thoſe grateful ſenſations which ſuch medicines give to the fibres, which cannot but invigorate their tonic undulations ſo much, that by degrees the obſtructed wind is diſlodged, and at laſt quite expelled: but if the obſtruction be not great, the rarefaction of the wind, upon taking ſuch a medicine, is often ſo ſudden, and likewiſe its diſcharge, that it goes off like the exploſion of gunpowder.

All the things under this claſs being warm and diſcuſſive, are much uſed in the compoſition of cathartics, of the rougher ſort eſpecially: for the irritation occaſioned by thoſe would be ſcarce tolerable without the mitigation of ſuch grateful ingredients. Many likewiſe of this ſortment are in the compoſition of diſcuſſive topics.

CARMINE, a beautiful crimſon colour, formed of the tinging ſubſtance of cochineal, brightened with aqua-fortis by a proceſs ſimilar to that uſed for dying ſcarlet in grain. It is of great advantage in painting, as well in water as varniſh, both on account of its beauty and ſtanding well; but it will not mix with oil ſo as to have the due effect in that kind of painting.

The preparation of this colour in perfection is kept a ſecret in France, where the beſt is prepared: for though ſome is made here of good line and brightneſs before it be uſed, yet it flies on its commixture with white; and turns purple even with the ſweat of the ſkin, if rubbed on the hands or face. The ſuperiority of the French carmine, as well as of the ſcarlet dye, has been attributed to ſome qualities in the air and water of France; but nothing is more abſurd than this ſuppoſition, as the air has very little concern in the production of carmine; and the qualities of the water, if different, might be artificially changed. But the difference itſelf betwixt the Engliſh and French carmine, which does not lie in the beauty of the colour, but in its durableneſs and fixed nature, clearly evinces a diverſity in the preparation; and leaves no room to doubt, but that the carmine might be equally well made in this country, if we were thoroughly maſters of the art; and by that means a conſiderable advantage would accrue to the public; as at preſent we buy of France the far greateſt part of what is conſumed, which is more than can be eaſily imagined, till we recollect how frequent the uſe of red is grown among the Engliſh ladies; and that this is almoſt the only ſubſtance uſed in this country as a red paint for living faces.

The compilers of the new French Encyclopedie have given two or three old recipes for the preparation of this colour; and afterwards recommended another, as preferable to them, taken from Kunckel, which on examination is only a proceſs for making bad lake of ſcarlet rags: but rather than inſert ſuch imperfect inſtructions for the making an article of great conſequence, as may delude thoſe who are earneſt in their purſuit of this art into a fruitleſs expence of time and money, we chooſe to be ſilent in this particular, inſtead of leading them into an error by groundleſs pretenſions to the contrary.

CARNATION, in botany, a name given to ſeveral ſpecies of caryophyllus, or pink, on account of their beautiful fleſh-colour.

Spaniſh CARNATION, a name ſometimes uſed for the poinciana of botaniſts.

CARNATION *Colour*, among painters, is underſtood of all the parts of a picture, in general, which repreſent fleſh, or which are naked and without drapery.

In colouring for fleſh, there is ſo great a variety, that it is hard to lay down any general rules for inſtruction therein; neither are there any regarded by thoſe who have acquired a ſkill this way: the various colouring for carnations, may be eaſily produced, by taking more or leſs red, blue, yellow, or biſtre, whether for the firſt colouring, or for the finiſhing: the colour for women ſhould be bluiſh; for children a little red, both freſh and gay; and for men it ſhould incline to yellow, eſpecially if they are old.

CARNELIAN, ſarda, in natural hiſtory, a precious ſtone, of which there are three kinds, diſtinguiſhed by three colours, a red, a yellow, and a white. Authors have attributed medicinal virtues to this ſtone, meaning the red carnelian; this therefore is to be underſtood the ſarda, or carnelian of the ſhops. It is very well known among us, and is found in roundiſh or oval maſſes, much like our common pebble; and is generally met with between an inch and two or three inches in diameter: it is of a fine, compact, and cloſe texture; of a gloſſy ſurface; and, in the ſeveral ſpecimens, is of all the degrees of red, from the paleſt fleſh-colour to the deepeſt blood-red. It is generally free from ſpots, clouds, or variegations; but ſometimes it is veined very beautifully with an extremely pale red, or with white; the veins forming concentric circles, or other leſs regular figures, about a nucleus, in the manner of thoſe of agates.

The pieces of carnelian which are all of one colour, and ſeats, behind the palatines, or great ſenators. They are a kind of lieutenants of provinces, and command a part of the palatinate under the palatine.

CASTILLAN, or Castillane, a gold coin, current in Spain, and worth fourteen rials and ſixteen deniers.

Castillan is alſo a weight uſed in Spain for weighing gold. It is the hundredth part of a pound Spaniſh weight.

What they commonly call a weight of gold in Spain, is always underſtood of the caſtillan.

CASTING, in foundery, the running of a metal into a mould, prepared for that purpoſe.

Casting *of Lead* is the uſing a frame, or mould, covered with ſand, to caſt the lead into ſheets.

Casting *of Metals*, *of Letters*, *Bells*, *Figures*, *&c.* See the article Foundery.

Casting *in Sand or Earth* is the running of metals between two frames, or moulds, filled with ſand or earth, wherein the figure that the metal is to take has been impreſſed *en creux*, by means of the pattern.

Casting, among ſculptors, implies the taking of caſts and impreſſions of figures, buſts, medals, leaves, &c.

The method of taking of caſts of figures and buſts, as at preſent practiſed, is moſt generally by the uſe of plaſter of Paris; or, in other words, alabaſter calcined by a gentle heat. The advantage of uſing this ſubſtance preferably to others, conſiſts in this, that notwithſtanding a ſlight calcination reduces it to a pulverine ſtate, it becomes again a tenacious and cohering body, by being moiſtened with water, and afterwards ſuffered to dry; by which means either a concave or a convex figure may be given by a proper mold or model to it when wet, and retained by the hardneſs it acquires when dry: and from theſe qualities, it is fitted to the double uſe of making both caſts, and molds for forming thoſe caſts. The plaſter is to be had ready prepared of thoſe who make it their buſineſs to ſell it; and the only care is to ſee that it is genuine.

The particular manner of making caſts depends on the form of the ſubject to be taken. Where there are no projecting parts, it is very ſimple and eaſy; as likewiſe where there are ſuch as form only a right or any greater angle with the principal ſurface of the body: but where parts project in leſſer angles, or form a curve inclined towards the principal ſurface of the body, the work is more difficult. We ſhall therefore firſt explain thoſe particulars of the manner which are general to all kinds; and then point out the extraordinary methods to be uſed where difficulties occur.

The firſt ſtep to be taken is the forming the mold; which is, indeed, done by much the ſame means as the caſt is afterwards made in it. In order to this, if the original or model be a baſs-relief, or any other piece of a flat form, having its ſurface firſt well greaſed, it muſt be placed on a proper table, or other ſuch ſupport, and ſurrounded by a frame, the ſides of which muſt be at ſuch a diſtance from it, as will allow a proper thickneſs for the ſides of the mold. A due quantity of the plaſter, that is, what will be ſufficient to cover and riſe to ſuch a thickneſs as may give ſufficient ſtrength to the mold, as alſo to fill the hollow betwixt the frame and the model, muſt be moiſtened with water, till it be juſt of ſuch conſiſtence as will allow it to be poured upon the model, which ſhould be done as ſoon as poſſible: for it muſt not be delayed after the water is added to the plaſter, which would otherwiſe concrete or ſet, ſo as to become more troubleſome in the working, or unfit to be uſed. The whole muſt then be ſuffered to remain in this condition, till the plaſter has attained its hardneſs; and then the frame being taken away, the preparatory caſt or mold thus formed, may be taken off from the ſubject entire.

Where the model or original ſubject is of a round or erect form, a different method muſt be purſued; and the mold muſt be divided into ſeveral pieces: or if the ſubject conſiſts of detached and projecting parts, it is frequently moſt expedient to caſt ſuch parts ſeparately; and afterwards join them together.

Where the original ſubject or model forms a round, or ſpheroid, or any part of ſuch round or ſpheroid, more than one half the plaſter muſt be uſed without any frame to keep it round the model; and muſt be tempered, with water, to ſuch a conſiſtence, that it may be wrought with the hand like very ſoft paſte: but though it muſt not be ſo fluid as when prepared for flat figured models, it muſt yet be as moiſt as is compatible with its cohering ſufficiently to hold together: and being thus prepared, it muſt be put upon the model, and compreſſed with the hand, or any flat inſtrument, that the parts of it may adapt themſelves, in the moſt perfect manner, to thoſe of the ſubject, as well as be compact with reſpect to themſelves. When the model is ſo covered to a convenient thickneſs, the whole muſt be left at reſt till the plaſter be ſet and firm, ſo as to bear dividing without falling to pieces, or being liable to be put out of its form by ſlight violence; and it muſt then be divided into pieces, in order to its being taken off from the model, by cutting it with a knife with a very thin blade; and being divided, muſt be cautiouſly taken off, and kept till dry: but it muſt be always carefully obſerved, before the ſeparation of the parts be made, to notch them croſs the joints, or lines of the diviſion, at proper diſtances, that they may with eaſe and certainty be properly conjoined again; which would be much more precarious and troubleſome without ſuch directive marks. The art of properly dividing the molds, in order to make them ſeparate from the model, conſtitutes the greateſt object of dexterity and ſkill in the art of caſting; and does not admit of rules for the moſt advantageous conduct of it in every caſe. But we ſhall endeavour to explain the principles on which it depends, in ſuch manner, that by a due application of them, all difficulties may at any time be ſurmounted, and an expertneſs, even of manner, acquired by a little practice. With reſpect to the caſe in queſtion, where the ſubject is of a round or ſpheroidal form, it is beſt to divide the mold into three parts, which will then eaſily come off from the model: and the ſame will hold good of a cylinder or any regular curve figure.

The mold being thus formed, and dry, and the parts put together, it muſt be firſt greaſed, and placed in ſuch a poſition that the hollow may lie upwards, and then filled with plaſter, commixt with water, in the ſame proportion and manner as was directed for the caſting the mold: and when the caſt is perfectly ſet, and dry, it muſt be taken out of the mold and repaired, where it is neceſſary; which finiſhes the whole operation.

This is all that is required with reſpect to ſubjects where the ſurfaces have the regularity above-mentioned: but where they form curves, which interſect each other, the conduct of the operation muſt be varied with reſpect to the manner of taking the caſt of the mold from off the ſubject or model; and where there are long projecting parts, ſuch as legs or arms, they ſhould, as was obſerved before, be wrought in ſeparate caſts.

The method of dividing properly the molds cannot be reduced, as we intimated, to any particular rules; but muſt depend in ſome degree on the ſkill of the operator, who may eaſily judge from the original ſubjects, by the means here ſuggeſted, what parts will come off together, and what require to be ſeparated: the principle of the whole conſiſts only in this, that where under-workings, as they are called, occur; that is, wherever a ſtraight line, drawn from the baſis or inſertion of any projection, would be cut or croſſed by any part of ſuch projection, ſuch part cannot be taken off without a diviſion; which muſt be made either in the place where the projection would croſs the ſtraight line; or, as that is frequently difficult, the whole projection muſt be ſeparated from the main body, and divided alſo lengthwiſe into two parts: and where there are no projections from the principal ſurfaces, but the body is ſo formed as to render the ſurface a compoſition of ſuch curves, that a ſtraight line being drawn parallel to the ſurface of one part would be cut by the outline, in one or more places, of another part, a diviſion of the whole ſhould be made, ſo as to reduce the parts of it into regular curves, which muſt then be treated as ſuch.

Where detached parts of a long form, as legs, arms, ſpears, ſwords, &c. occur in any figure, they ſhould be caſt in ſeparate molds: and if ſuch parts are of a compound ſtructure, the ſame rules, as was before intimated, muſt be obſerved in the management of them, as are already divided for the principal part.

In larger maſſes, where there would otherwiſe be a great thickneſs of the plaſter, a corps or body may be put within the mold, in order to produce a hollow in the caſt; which both ſaves the expence of the plaſter, and renders the caſt lighter.

This corps may be of wood, where the forming a hollow of a ſtraight figure, or ſuch as conical with the baſis outward, will anſwer the end: but if the cavity require to be round, or of any curve figure, the corps cannot be then drawn while entire; and conſequently ſhould be of ſuch matter as will ſuffer itſelf to be taken out piecemeal. In this caſe, therefore, the corps is beſt formed of clay; which muſt be worked upon wires to give it tenacity, and ſuſpended in the hollow of the mold, by croſs wires lying over the mouth: and when the plaſter is ſufficiently ſet to bear handling, the clay muſt be picked out by a proper inſtrument.

Where it is deſired to render the plaſter harder, the water with which it is tempered ſhould be mixed with parchment ſize properly prepared, which will make it very firm and tenacious.

In the ſame manner figures, buſts, &c. may be caſt of lead, or any other metal, in the molds of plaſter; only the expence of plaſter, and the tediouſneſs of its becoming ſufficiently dry, when in a very large maſs, to bear the heat of melted metal, render the uſe of clay, compounded with ſome other proper materials, preferable where large ſubjects are in queſtion. The clay, in this caſe, ſhould be waſhed over till it be perfectly free from gravel or ſtones; and then mixed with a third or more of fine ſand to prevent its cracking; or, inſtead of ſand, coal-aſhes ſifted till they be perfectly fine is preferable. Whether plaſter or clay be uſed for the caſting in metal, it is extremely neceſſary to have the mold perfectly dry; otherwiſe the moiſture, being rarefied, will make an exploſion that will blow the metal out of the mold, and endanger the operator, or at leaſt crack the mold in ſuch a manner as to fruſtrate the operation. Where the parts of a mold are larger or project much, and conſequently require a greater tenacity of coheſion of the matter they are formed of to keep them together, flocks of cloth, prepared like thoſe deſigned for paper hangings, or fine cotton plucked or cut till it is very ſhort, ſhould be mixed with the aſhes or ſand before they be added to the clay to make the compoſition for the mold. The proportion ſhould be according to the degree of coheſion required: but a ſmall quantity will anſwer the end, if the other ingredients of the compoſition be good, and the parts of the mold properly linked together by means of the wires above directed.

There is a method of taking caſts in metals from ſmall animals, and the parts of vegetables, which, though not much known or uſed in this country, may be nevertheleſs practiſed for ſome purpoſes with advantage; particularly for the decorating grottoes or rock work, where nature is imitated. The proper kinds of animals are lizards, ſnakes, frogs, birds, or inſects; the caſts of which being properly coloured will be exact repreſentations of the originals.

This is to be performed by the following method. A coffin or proper cheſt for forming the mold being prepared of clay, or four pieces of boards fixed together, the animal or parts of vegetables muſt be ſuſpended in it by a ſtring; and the leaves, tendrils, or other detached parts of the vegetables, or the legs, wings, &c. of the animals, properly ſeparated and adjuſted in their right poſition by a ſmall pair of pincers; and a due quantity of plaſter of Paris and calcined talc, in equal quantities, with ſome alumen plumoſum, muſt then be tempered with water to the proper conſiſtence for caſting; and the ſubject from whence the caſt is to be taken, as alſo the ſides of the coffin moiſtened with ſpirit of wine.

The coffin or cheſt muſt be then filled with the tempered compoſition of the plaſter and talc, putting at the ſame time a piece of ſtraight ſtick or wood to the principal part of the body of the ſubject, and pieces of thick wire to the extremities of the other parts, in order that they may form, when drawn out after the matter of the mold is properly ſet and firm, a channel for pouring in the melted metal, and vents for the air; which otherwiſe, by the rarefaction it would undergo from the heat of the metal, would blow it out or burſt the mold. In a ſhort time the plaſter and talc will ſet and become hard, when the ſtick and wires may be drawn out, and the frame or coffin in which the mold was caſt taken away: and the mold muſt then be put firſt into a moderate heat, and afterwards, when it is as dry as it can be rendered by that degree, removed into a greater; which may be gradually increaſed, till the whole be red-hot. The animal, or part of any vegetable, which was included in the mold, will then be burnt to a coal; and may be totally calcined to aſhes, by blowing for ſome time gently into the channel and paſſages made for pouring in the metal, and giving vent to the air, which will, at the ſame time that it deſtroys the remainder of the animal or vegetable matter, blow out the aſhes. The mold muſt then be ſuffered to cool gently; and will be perfect; the deſtruction of the ſubſtance of the animal or vegetable, having produced a hollow of a figure correſpondent to it: but it may be nevertheleſs proper to ſhake the mold, and turn it upſide down, as alſo to blow with the bellows into each of the air vents, in order to free it wholly from any remainder of the aſhes; or, where there may be an opportunity of filling the hollow with quickſilver without expence, it will be found a very effectual method of clearing the cavity, as all duſt, aſhes, or ſmall detached bodies will neceſſarily riſe to the ſurface of the quickſilver; and be poured out with it. The mold being thus prepared, it muſt be heated very hot when uſed, if the caſt be made with copper or braſs; but a leſs degree will ſerve for lead or tin: and the matter being poured in, the mold muſt be gently ſtruck; and then ſuffered to reſt till it be cold; at which time it muſt be carefully taken from the caſt; but without the leaſt force; for ſuch parts of the matter as appear to adhere more ſtrongly, muſt be ſoftened by ſoaking in water, till they be entirely looſened, that none of the more delicate parts of the caſt may be broken off or bent.

Where the alumen plumoſum, or talc, cannot eaſily be procured, the plaſter may be uſed alone; but it is apt to be calcined by the heat uſed in burning the animal or vegetable from whence the caſt is taken; and to become of too incohering and crumbly a texture: or for cheapneſs Sturbridge clay, or any other potter's or other good clay, waſhed over till it be perfectly fine, and mixed with an equal part of ſand, and ſome flocks cut ſmall, may be employed. Pounded pumice-ſtone and plaſter of Paris, taken in equal quantities, and mixed with waſhed clay in the ſame proportion, is ſaid to make excellent molds for this and parallel uſes.

Caſts of medals, or ſuch ſmall pieces as are of a ſimilar form, may be made in plaſter, by the method directed for baſs-relievos.

Indeed there is nothing more required than to form a mold by laying them on a proper board; and having ſurrounded them by a rim made of a piece of a card, or any other paſteboard, to fill the rim with ſoft tempered plaſter of Paris: which mold, when dry, will ſerve for ſeveral caſts. It is nevertheleſs a better method to form the mold of melted ſulphur; which will produce a ſharper impreſſion in the caſt, and be more durable than thoſe made of plaſter.

The caſts of medals are likewiſe frequently made of ſulphur, which being melted, muſt be treated exactly in the ſame manner as the plaſter.

Caſts may be made likewiſe with iron, with very little additional trouble, provided it be prepared in the following manner.

“ Take any iron bar, or piece of a ſimilar form; and having heated it red-hot, hold it over a veſſel containing water, and touch it very ſlightly with a roll of ſulphur, which will immediately diſſolve it, and make it fall in drops into the water under it. As much iron as may be wanted being thus diſſolved, pour the water out of the veſſel; and pick out the drops formed by the melted iron from thoſe of the ſulphur, which contain little or no iron, and will be diſtinguiſhable from the other by their colour and weight.”

The iron will, by this means, be rendered ſo ſenſible, or eaſy to be melted, that it will run with leſs heat than will melt lead; and may be employed for making caſts of medals, and many other ſuch purpoſes, with great convenience and advantage.

Impreſſions of medals, having the ſame effect as caſts, may be made alſo of iſinglaſs glue by the following means. Melt the iſinglaſs, beaten as when commonly uſed, in an earthen pipkin, with the addition of as much water as will cover it, ſtirring it gently till the whole is diſſolved: then, with a bruſh of camels hair, cover the medal, which ſhould be previouſly well cleanſed and warmed, and then laid horizontal on a board or table, greaſed in the part around the medal. Let them reſt afterwards till the glue be properly hardened; and then, with a pin, raiſe the edge of it; and ſeparate it carefully from the medal; the caſt will be thus formed by the glue as hard as horn, and ſo light, that a thouſand will ſcarcely weigh an ounce. In order to render the relief of the medal more apparent, a ſmall quantity of carmine may be mixed with the melted iſinglaſs; or the medal may be previouſly coated with leaf-gold by breathing on it, and then laying it on the leaf, which will by that means adhere to it: but the uſe of the leaf-gold is apt to impair a little the ſharpneſs of the impreſſion.

There is likewiſe a method of making impreſſions of the ſame kind in lead; which is this: Lay the medal on a poſt, or other firm body of wood; and cover it with a piece of very thin plate of lead; and lay over that another piece of thicker plate: then place on them endways, a piece of wood turned of a round figure, which may be a foot or more in length; and of ſuch thickneſs, that its diameter may be ſomewhat greater than that of the medal. Strike then forcibly on the upper-end of the wood with a mallet, or ſome ſuch inſtrument; and the undermoſt plate of lead will receive the impreſſion of the medal: to preſerve which, the concave of the reverſe may be filled up with reſin, mixed with an equal part of brick-duſt, and melted. The impreſſion ſhould be made with one ſtroke, which will produce a ſufficient effect, if given with due ſtrength, and in a perpendicular direction. Impreſſions may be even taken from ſealing-wax or ſulphur in this manner, if the pieces be no way concave or bending on their under-ſide.

Impreſſions of medals may be likewiſe taken in putty; but it ſhould be the true kind made of earth, of tin, and drying oil. Theſe may be formed in the molds previouſly taken in plaſter or ſulphur, or molds may be made in its own ſubſtance, in the manner directed for thoſe of the plaſter. Theſe impreſſions will be very ſharp and hard; but the greateſt diſadvantage that attends them, is their drying very ſlowly, and being liable in the mean time to be damaged.

Impreſſions of prints, or other engravings, may be taken from copper-plates, by cleanſing them thoroughly, and pouring plaſter upon them: but the effect, in this way, is not ſtrong enough for the eye; and therefore the following method is preferable, where ſuch impreſſions on plaſter are deſired.

Take vermilion, or any other coloured pigment, finely powdered, and rub it over the plate: then paſs a folded piece of paper, or the flat part of the hand, over the plate to take off the colour from the lights or parts where there is no engraving: the proceeding muſt then be the ſame as where no colour is uſed. This laſt method is alſo applicable to the making of impreſſions of copper-plates on paper with dry colours: for the plate being prepared as here directed, and laid on the paper properly moiſtened, and either paſſed under the rolling-preſs, or any other way ſtrongly forced down on the paper, an impreſſion of the engraving will be obtained.

Impreſſions may be likewiſe taken from copper-plates, either on plaſter or paper, by means of the ſmoke of a candle or lamp; if, inſtead of rubbing them with any colour, the plate be held over the candle or lamp till the whole ſurface become black, and then wiped off by the flat of the hand, or paper.

Theſe methods are not, however, of very great uſe in the caſe of copper-plates, except where impreſſions may be deſired on occaſions where printing-ink cannot be procured: but as they may be applied likewiſe to the taking impreſſions from ſnuff-boxes, or other engraved ſubjects, by which means deſigns may be inſtantly borrowed by artiſts or curious perſons, and preſerved for any uſe, they may in ſuch inſtances be very uſeful.

The expedient of taking impreſſions by the ſmoke of a candle or lamp may be employed alſo for botanical purpoſes in the caſe of leaves, as a perfect and durable repreſentation of not only the general figure, but the contexture and diſpoſition of the larger fibres, may be extemporaneouſly obtained at any time. The ſame may be nevertheleſs done in a more perfect manner, by the uſe of linſeed oil, either alone, or mixed with a ſmall proportion of colour, where the oil can be conveniently procured: but the other method is valuable on account of its being practicable at almoſt all ſeaſons, and in all places, within the time that the leaves will keep freſh and plump. In taking theſe impreſſions, it is proper to bruiſe the leaves, ſo as to take off the projections of the large ribs, which might prevent the other parts from plying to the paper.

Leaves, or alſo the petals, or flower leaves of plants, may themſelves be preſerved on paper, with their original appearance, for a conſiderable length of time, by the following means.—Take a piece of paper, and rub it over with the iſinglaſs glue treated as above directed for taking impreſſions from medals; and then lay the leaves in a proper poſition on the paper. The glue laid on the paper being ſet, bruſh over the leaves with more of the ſame; and that being dry likewiſe, the operation will be finiſhed; and the leaves ſo ſecured from the air and moiſture, that they will retain their figure and colour much longer than by any other treatment.

Butterflies, or other ſmall animals of a flat figure, may alſo be preſerved in the ſame manner.

CASTLE-WARD, or CASTLE-GUARD, a tax laid on ſuch as dwell within a certain diſtance of a caſtle, towards the maintenance of thoſe that watch and ward the caſtle: the word is ſometimes uſed for the circuit itſelf inhabited by ſuch as are ſubject to this ſervice.

CASTLE-WORK, ſervice or labour done by inferior tenants for the building and upholding of caſtles of defence, towards which ſome gave their perſonal aſſiſtance, and others paid their contributions. This was one of the three neceſſary charges to which all lands among our Saxon anceſtors were expreſsly ſubject.

CASTOR. See BEAVER and CASTOREUM.

CASTOR, in aſtronomy, a moiety of the conſtellation of Gemini, called alſo Apollo. See the article GEMINI.

CASTOR and POLLUX, two meteors which ſometimes, in a ſtorm at ſea, appear ſticking to ſome part of the ſhip, in the ſhape of two fire-balls: when only one is ſeen, it is more properly called Helena. The two together are adjudged to portend a ceſſation of the ſtorm; but one alone portends ill, and that the ſevereſt part of the tempeſt is yet to come: both theſe balls are by ſome called Tyndarides.

CASTOREUM, CASTOR, the inguinal glands of the caſtor or beaver, a four-footed amphibious animal, frequent in ſeveral parts of Europe, and in North-America. Theſe glands are of different ſhapes and ſizes, covered with a thick ſkin, including an unctuous liquid matter, which in keeping grows dry and hard: on cutting the dry cods, as they are called, they are found full of a brittle friable ſubſtance, of a browniſh red colour, interſperſed with fine membranes and fibres exquiſitely interwoven. The beſt caſtor comes from Ruſſia, in large, round, hard cods; an inferior ſort, ſmaller and moiſter, from Dantzick; the worſt of all from New England, in longiſh thin cods.

Ruſſia caſtor has a ſtrong not agreeable ſmell, and a biting bitteriſh nauſeous taſte: the other ſorts are weaker than that of Ruſſia, yet more ungrateful. It is generally looked upon as one of the capital nervine, antiſpaſmodic, and antihyſteric medicines: its virtues have undoubtedly been much exaggerated; but though they are not near ſo great as they have by moſt writers been repreſented, they appear nevertheleſs to be conſiderable. The common doſe is from two or three grains to a ſcruple; though it has been ſometimes taken by drams, and theſe doſes very often repeated.

Rectified ſpirit, proof ſpirit, and water, extract, by the aſſiſtance of heat, nearly all the active matter of caſtor:

rectified ſpirit diſſolves moſt readily the finer and leſs ungrateful, and water the more nauſeous bitter parts: proof ſpirit acts equally, but difficultly, on both. Three ounces of powdered Ruſſia caſtor, digeſted with a gentle heat, for three days, in a quart of rectified ſpirit, communicated a deeper reddiſh tincture, and a ſtronger though rather leſs ungrateful taſte, than four ounces did to the ſame quantity of proof-ſpirit by maceration without heat for ten days. On digeſting in the two ſpirits equal quantities of the powder, with equal degrees of heat, for ten or twelve hours, the tincture in proof-ſpirit proved ſenſibly moſt ungrateful, and that in rectified-ſpirit poſſeſſed moſt perfectly the ſpecific flavour of the caſtor: an infuſion in boiling water was bitterer and more nauſeous than either. The caſtor remaining after the action of water, retained a little of its flavour, but nothing of its nauſeous bitterneſs: that left by rectified-ſpirit retained a little of the latter, but nothing of the former; and the reſiduum of proof-ſpirit a little of both.

In diſtillation it gives over to water the whole of its ſmell and flavour: a quart of water, diſtilled from an ounce of Ruſſia caſtor, receives a conſiderably ſtrong impregnation, but gradually loſes the greateſt part of it in being kept. It is ſaid, that on ſubmitting to this operation, large quantities of the caſtor, a ſmall portion of eſſential oil is obtained, which ſmells exceeding ſtrongly, and diffuſes its ungrateful ſcent to a great diſtance. This odorous and moſt active prince of the caſtor is carried off by water in a very gentle heat; infuſions or light decoctions, which are very nauſeous, yielding, however ſlowly inſpiſſated, a brittle extract, which has nothing of the ſpecific flavour of the drug, and proves in taſte but weakly though ungratefully bitteriſh. Rectified-ſpirit on the other hand, diſtilled from the tincture made in that menſtruum, brings over ſcarcely any ſenſible impregnation; nearly all that it had extracted from the caſtor, remaining entire in the inſpiſſated maſs, which proves of an unctuous conſiſtence, not eaſily reducible to dryneſs.

Caſtor is commonly joined in preſcription with the deobſtruent fetid gums, volatile alkaline ſalts, the volatile oily ſpirits, and other materials of ſimilar intention. The volatile oily ſpirits are well adapted alſo as menſtrua for diſſolving the active matter of the caſtor, at the ſame time that they prove in many caſes excellent additions to its virtue, as particularly in ſome hyſteric diſorders, and the ſeveral ſymptoms which accompany them: in this view, an ounce of Ruſſia caſtor, and half as much aſafetida, are digeſted about ſix days, in a cloſe veſſel, with a pint of the volatile ſpirit. *Lewis's Materia Medica.*

CASTRATION, in ſurgery, the operation of gelding. See SARCOCELE.

CASU CONSIMILI, in law, a writ of entry granted where a tenant, by courteſy or for life, aliens either in fee, in tail, or for the term of another's life. It is brought by him in reverſion againſt the perſon to whom ſuch tenant does ſo alien to the prejudice of the reverſioner, in the tenant's life-time.

CASU PROVISO, in law, a writ of entry founded on the ſtatute of Glouceſter, where a tenant in dower aliens the lands ſhe ſo holds in fee, or for life; and lies for the party in reverſion againſt the alience.

CAT, *Felis*, a well known quadruped, of the order of the feræ, or beaſts of prey. See the article FELIS.

CAT-MINT, in botany, the Engliſh name of the cataria of botaniſts.

CAT *of the Mountain*, *Catus Pardus*, an animal of the cat-kind, about the ſize of a maſtiff, variegated with longitudinal black ſtreaks on the upper-part of the body, and black ſpots on the under-part.

CATACAUSTICS, or CAUSTICS, in the higher geometry, are curves formed by reflected rays. Theſe curves are generated after the following manner. If an infinite number of rays, as BA, BM, BD, &c. (plate XXXV. *fig.* 2 & 5.) iſſuing from a luminous point B, be reflected by the curve AMD, in ſuch manner that the angles of reflection be equal to thoſe of incidence, the curve HFN that touches the reflected rays, or their continuations AH MF, DN is called the cauſtic by reflection. If HA (*fig.* 2.) be continued out to I, ſo that AI = AB, and the cauſtic HFN be taken as an evolute, and IA as the firſt radius of evolution, then will the involute ILK to the ſame, be of ſuch a nature, that the tangent FL ſhall be conſtantly equal to the part FH of the cauſtic, together with the right line HI. Let B*m*, *m*F, be two reflected rays infinitely near BM, MF; then if F*m* be continued out to *l*, and the arches MO, MR, deſcribed from the centers F and B, the indefinitely ſmall right-angled triangles MO*m*, MR*m*, will be equal and ſimilar; for the angle O*m*M = F*m*D = R*m*M, and the hypothenuſe M*m* common; whence O*m* = R*m*. Now, becauſe R*m* is the fluxion of BM, and is conſtantly ſo wherever the point M be taken, therefore ML − IA, or AH + HF − MF, the ſum of all the fluxions O*m* in the part AM of the curve is = BM − BA, the ſum of all the fluxions R*m* in the ſame part AM, and conſequently the part HF of the cauſtic HFN will be equal to BM − BA + MF − AH.

There may happen various caſes, according as the incident ray BA is greater or leſs than BM, and the reflected ray HA, as a radius of evolution, diſengages itſelf from the part HF of the curve, to become MF: but the difference of the radii of incidence is equal to the difference of the reflected rays, added to that part of the cauſtic, taken as an evolute, that one of the rays diſengages itſelf from before it coincides with the other. Thus BM − BA (*fig.* 5.) = MF + FH − AH, and conſequently FH = BM − BA + AH − MF.

If the arch AP be deſcribed from the center B, it is plain that PM ſhall be the difference of the incident rays BM, BA. And if the luminous point B becomes infinitely diſtant from the curve AMD, the incident rays BA, BM, will become parallel, and the arch AP a ſtraight line perpendicular to thoſe rays.

If the figure BAMD (*fig.* 2.) be ſuppoſed to be inverted on the ſame plane, ſo that the point B coincides with I; and the tangent to the curve AMD in its firſt ſituation, ſtill touches it in this latter one, and if the curve *a*M*d* revolves on AMD, viz. on itſelf, ſo that the parts *a*M, AM, be always equal; then, by this motion, the point B will deſcribe a kind of cycloid ILK, which will be an involute to the cauſtic HFN, taken as an evolute: for from the geneſis it follows, 1°. That the line LM, drawn from the deſcribent point L, to the point of contact M, will be perpendicular to the curve ILK. 2°. That L*a* or IA = BA, and LM = BM. 3°. That the angles made by the right lines ML, BM, with the common tangent in M, are equal; and therefore if LM be continued out to F, MF ſhall be the incident ray BM reflected: whence the perpendicular LF touches the cauſtic HFN; and ſince this is always ſo, let the point L be taken where it will, it is plain that ILK is the involute to the cauſtic HFN, the right line HI being the radius of evolution. Hence it follows, that the part FH or FL − HI = BM + MF − BA − AH.

When the tangent DN is infinitely near the tangent FM, it is manifeſt that the point of contact N, and the point of interſection V, will both coincide with F, the other point of contact: ſo that the point F, wherein the reflected ray MF touches the cauſtic HFN, is determined, with only ſeeking the concurrence of the infinitely near reflected rays MF, *m*F; conſequently the interſections of the infinitely near incident rays, when reflected, will form the cauſtic HFN.

Problem. —— The nature of the curve AMD (*fig.* 4.) the radiatory point B, and the incident ray BM being given; to find the point F in the reflected ray MF given in poſition, wherein it touches the cauſtic: find MC, the length of the radius of evolution in the point M, aſſume the infinitely ſmall arch M*m*, draw the right lines B*m*, C*m*, F*m*, from the centers B, F, deſcribe the ſmall arches MR, MO, draw CE, C*e*, CG, C*g*, perpendicular to the incident and reflected rays: and laſtly, call the given quantities BM, *y*, ME or MG, *a*. The triangles MR*m*, MO*m*, are equal and ſimilar, and ſo MR = MO. But becauſe of the equality of the angles of incidence and reflection, we have alſo CE = CG, C*e* = C*g*; and therefore CE − C*e* or EQ = CG − C*g* or SG. Whence becauſe of the ſimilar triangles BMR, BEQ; FMO, FGS, BM + BE $(2y-a)$: BM (y) ::

:: MR + EQ, or MO + GS : MR or MO :: MG (a) : $MF = \frac{ay}{2a-y}$.

If the radiating point B falls on the other ſide the point E, with reſpect to the point M, or, which is the ſame thing, if the curve A M D be convex next the radiating point B, then will y be negative, and conſequently $MF = \frac{-ay}{-2y-a}$, or $\frac{ay}{2y+a}$.

If y be infinite; that is, if the point B (*fig.* 3.) be at an infinite diſtance from the curve A M D, then the incident rays will be parallel, and MF will be $= \frac{1}{2} a$, becauſe a is nothing with reſpect to $2y$.

When the given curve is a geometrical one, the cauſtic will be ſo too, and the cauſtic will always be rectifiable.

The cauſtic of the circle is a cycloid, formed by the revolution of a circle along a circle.

The cauſtic of the common cyloid, when the rays are parallel to the axis thereof, is alſo a common cycloid, deſcribed by the revolution of a circle upon the ſame baſe.

The cauſtic of the logarithmic ſpiral is the ſame curve.

CATACHRESIS, in rhetoric, a trope which borrows the name of one thing to expreſs another. Thus Milton deſcribing Raphael's deſcent from the empyreal Heaven to Paradiſe, ſays,

> " Down thither prone in flight
> " He ſpeeds, and through the vaſt ethereal ſky
> " Sails between worlds and worlds."

CATACOMB, a grotto or ſubterraneous place for the burial of the dead.

The term is particularly uſed in Italy for a vaſt aſſemblage of ſubterraneous ſepulchres, three leagues from Rome, in the Via Appia, ſuppoſed to be the ſepulchres of the ancients. Others imagine theſe catacombs to be the cells wherein the primitive Chriſtians hid themſelves. Each catacomb is three feet broad, and eight or ten high, running in form of an alley or gallery, and communicating with one another.

Some authors ſuppoſe them to have been the puticuli mentioned by Feſtus Pompeius, into which the Romans threw the bodies of their ſlaves, to whom they denied the honours of burying: and Mr. Monro, in the Philoſophical Tranſactions, gives it as his opinion, that the catacombs were the burial-places of the firſt Romans, before the practice of burning the dead was introduced; and that they were dug in conſequence of theſe opinions, that ſhades hate the light, and love to hover about the places where their bodies were laid.

CATACOUSTICS, an appellation given to the doctrine of reflected ſounds. See ECHO.

CATADIOPTRICAL TELESCOPE, that otherwiſe called a reflecting one. See the article TELESCOPE.

CATADROME, an engine like a crane, uſed by builders in raiſing weights.

CATADUPA, a water-fall, or cataract. See the article CATARACT.

Hence the inhabitants about the cataracts of the Nile were called catadupi by the ancients.

CATAFALCO, in architecture, a decoration of ſculpture, painting, &c. raiſed on a timber-ſcaffold, to ſhew a coffin or tomb in a funeral ſolemnity.

CATALEPSY, *Catalepſis*, in phyſic, a kind of apoplexy; or a diſeaſe wherein the limbs are eaſily flexible, and continue in whatever poſition they are placed.

The word is derived from καταλαμβανω, to ſeize, or interrupt.

The natural cauſes which generally bring on the paroxyſms of a catalepſis, are a peccancy of the thick and viſcid humours, and intenſe cold; and the accidental are violent commotions of the mind, grief, terror, joy, fear, and ſadneſs.

As to the prognoſtics of a catalepſis, if it is produced by the paſſions of the mind, or profound meditations, it is ſeldom attended with dangerous conſequences: but, on the contrary, when it proceeds from a thick, viſcid, and impure blood, or from a ſuppreſſion of accuſtomed evacuations of blood, it is highly dangerous; for it either terminates in melancholy, or is changed into an epilepſy; or, laſtly, terminates in a violent apoplexy, and kills the patient. Nor is the congelation brought on by extreme cold of leſs danger; ſince, if ſeaſonable relief is not afforded, ſudden death enſues.

In the cure of this terrible diſorder, two curative intentions are principally to be regarded. The firſt is to relax the ſpaſmodic ſtricture of the ſmall nervous fibres in the brain. The ſecond is cautiouſly to remove the material or ſecondary cauſes which contribute to the production of this conſtriction. The former is principally to be anſwered during the paroxyſm, but the latter when the perſon is out of it.

CATALLIS CAPTIS NOMINE DISTRICTIONIS, in law, a writ which lies where a houſe is within a borough, for rent iſſuing out of the ſame: and this writ warrants the taking of doors or windows by way of diſtreſs.

CATALLIS REDENDIS, a writ that lies where goods being delivered to a perſon to keep until a certain day, are not on demand delivered on that day.

CATALOGUE, a liſt or enumeration of the names of ſeveral books, men, or other things, according to a certain order.

CATALOGUE *of Stars*, an enumeration both of the conſtellations and the unformed ſtars, with the number of ſtars in both, and the place of each ſtar. The firſt of this kind amongſt the Greeks was made by Hipparchus of Rhodes, who flouriſhed about 120 years before Chriſt. He, as Pliny informs us in his Natural Hiſtory, upon the appearance of a new ſtar, began to doubt whether there might not be changes amongſt the fixed ſtars, and therefore made a catalogue of them, ſetting down the place and magnitude of each ſtar, that if in time to come any new ſtars ſhould appear, or any of thoſe obſerved by him ſhould increaſe or be diminiſhed in magnitude, or ſhould totally diſappear, ſuch changes might be known to after ages.

The moſt ancient catalogue now extant is that of Ptolemy, copied chiefly from Hipparchus, but with ſome few alterations; he ſettles the places of the ſtars as he himſelf obſerved them, in the beginning of the reign of Antoninus Pius, about the year 140; the number of ſtars in this catalogue is 1026. In imitation of Ptolemy, ſeveral aſtronomers have made catalogues of the ſtars, computing their places for ſome year in or near their own time.

It is to be obſerved, that the place of a ſtar is denoted by ſetting down its longitude and latitude; and that though the fixed ſtars keep the ſame ſituation in reſpect of one another, the ſphere of the Heavens appears to have a ſlow motion, by which the longitude of all the ſtars is altered at the rate of about 50″ in a year, their latitude continuing the ſame: this makes it neceſſary for any one who makes a catalogue of the ſtars, and ſets down their longitudes and latitudes, to tell us for what point of time the catalogue is calculated.

The Arabians are the firſt who after Ptolemy obſerved the ſtars, and noted down their places: the learned Hyde mentions ſeveral of their catalogues, and publiſhed the moſt conſiderable one of them in Arabic with a Latin tranſlation; it was made by Ulug Beigh, grandſon to Tamerlane, from his own obſervations at Samarcand: the number of the ſtars therein is 1022; their places are reduced to the year 1437.

Tycho Brahe tells us, that he had by his own obſervations, rectified the places of 1000 ſtars, and that he put that number upon his globe of ten feet diameter; notwithſtanding this, his catalogue publiſhed in his Progymnaſmata in the year 1602, a twelvemonth after his death, and afterwards by Longomontanus in his Aſtronomia Danica, contains but 777 ſtars, with their places for the year 1600: we have therein ſome ſtars omitted by Ptolemy, though the whole number falls ſhort of his, becauſe ſeveral ſouthern ſtars, which could be ſeen by Ptolemy at Alexandria in Egypt, are not viſible in Tycho's more northern ſituation at Uraniburg.

About the ſame time with Tycho, William Landgrave of Heſſe, aſſiſted by Rothmannus and Byrgius, obſerved the ſtars, and inſerted 400 of them in a catalogue, rectifying their places to the year 1593.

Bayer, in his Uranometria, publiſhed a catalogue of 1160 ſtars, compiled chiefly from Ptolemy and Tycho, together with figures of the conſtellations: one thing which makes this work valuable is this, that, beſides deſcribing the ſtars in the manner uſed by Ptolemy, every ſtar is marked with ſome letter; ſo that the biggeſt ſtar of every conſtellation is denoted by the firſt letter of the Greek alphabet, the next biggeſt by the ſecond, &c. and when any conſtellation contains a greater number of ſtars than that alphabet will reach, thoſe that remain are marked in like manner by letters of the Roman alphabet; by this means every ſtar is as eaſily diſtinguiſhed as if it had a proper name given to it.

This invention is ſo uſeful, that Flamſtead has in his own catalogue taken in Bayer's letters, as far as they go; as Senex alſo has done upon his largeſt globes, as alſo upon his planiſpheres.

Kepler, who had the uſe of Tycho's obſervations, publiſhed a catalogue of 1000 ſtars obſerved by Tycho, at the end of his Tabulæ Rudolphinæ; he adds thereto thoſe ſtars of Ptolemy's catalogue which Tycho had omitted, together with thoſe of the new ſouthern conſtellations, from other authors; ſo that his whole catalogue amounts to above 1160: the places of them are computed for the year 1600.

The celebrated Hevelius compoſed a catalogue of 1888 ſtars, whereof 1553 were obſerved by himſelf; the places of them were computed for the year 1660.

The largeſt and moſt complete is the Britiſh catalogue, owing to the labours of Mr. Flamſtead; it contains no leſs than 3000 ſtars, many of which are ſo ſmall, that they cannot be ſeen without the help of teleſcopes; their places are rectified to the year 1689. We have it in the third volume of his Hiſtoria Cæleſtis, wherein, beſides that of Ptolemy, we have alſo the abovementioned catalogues of Ulug Beigh, Tycho, the prince of Heſſe, and Hevelius, together with an account of each of them in the Prolegomena.

CATAMENIA, in medicine, the ſame with menſes. See MENSES.

CATAPACTYME, a feſtival kept by the Peruvians in the month of December, in honour of the ſun the father, the ſun the ſon, and the ſun the brother.

CATAPAN, a name given by the Greek emperors to the governor of Puglia and Calabria in Italy. They ſucceeded the exarchs of Ravenna; and Du Cange is of opinion, a chronological table of theſe governors might be very ſerviceable for underſtanding the Byzantine hiſtorians.

CATAPASM, among ancient phyſicians, ſignifies any dry medicine reduced to powder, in order to be uſed by way of inſpiration in the whole body, or any part of it. Some catapaſms are appropriated to ulcers, ſome to the ſkin: the former cicatrize, the latter are deterſive. We learn from Pliny, that catapaſms of roſes were uſed to reſtrain ſweat, and to dry the body after bathing.

CATAPHONICS, the ſcience which conſiders the properties of reflected ſounds. See the article ECHO.

CATAPHORA, in medicine, the ſame as coma. See the article COMA.

CATAPHRACTA, in antiquity, a kind of coat of mail, which covered the ſoldier from head to foot.

Hence cataphracti were horſemen armed with the cataphracta, whoſe horſes, as Salluſt ſays, were covered with linen full of iron plates diſpoſed like feathers.

CATAPHRYGIANS, ancient heretics, who took their name from the country of Phrygia. They ſuppoſed the Holy Spirit had abandoned the church, and therefore that Montanus, as a prophet, and Priſcilla and Maximilla, as true propheteſſes, were to be conſulted in every thing relating to religion. See the article MONTANIST.

CATAPLASM, in pharmacy, an external ſoft kind of medicine of the conſiſtence of pretty thick panada, and prepared of ingredients of different virtues, according to the intention of the phyſician.

The word is formed from κατα, with, and πλασσω, to anoint.

CATAPULTA, in antiquity, a military engine contrived for the throwing of arrows, darts, and ſtones upon the enemy. Some of theſe engines were of ſuch force, that they would throw ſtones of an hundred weight. Joſephus takes notice of the ſurpriſing effects of theſe engines, and ſays, that the ſtones thrown out of them beat down the battlements, knocked off the angles of the towers, and would level a whole file of men, from one end to the other, were the phalanx never ſo deep. This was called the

Battering CATAPULTA, and is repreſented on plate XIII. *fig.* 3. This catapulta is ſuppoſed to carry a ſtone, &c. of an hundred weight, and therefore a deſcription of it will be ſufficient to explain the doctrine of all the reſt; for ſuch as threw ſtones of twelve-hundred and upwards, were conſtructed on the ſame principles, only larger in proportion to the weight of the body they were intended to throw.

The baſe is compoſed of two large beams 2, 3. The length of thoſe beams is fifteen diameters of the bore of the capitals, which meaſure will be explained when we deſcribe the capitals 9. At the two extremities of each beam, two double mortiſes are to be cut to receive the eight tenons of the two croſs-beams 4, 5, each of them four of the diameters in length, without their tenon, obſerving to mark the centre of them exactly by a line cut deep in the wood 6. The croſs-beam 5 muſt be hollowed a little on the upper-ſide, or made not ſo thick as that at the other end, to give the greater bent to the tree or arm 22.

In the centre of each of the beams of the baſe 2, 3, and near two thirds of their length, a hole, perfectly round, and ſixteen inches in diameter, ſhould be bored: theſe holes muſt be exactly oppoſite to each other, and ſhould increaſe gradually to the inſide of the beams; ſo that each of them, being ſixteen inches on the outſide towards the capitals 9, ſhould be ſeventeen and an half at the opening on the inſide; and the edges carefully rounded off. The capitals 9 are, in a manner, the ſoul of the machine, and ſerve to twiſt and ſtrain the cordage, which form its principle, or power of motion.

The capitals 9 are either of caſt braſs, or iron, each conſiſting of a wheel with teeth, 10, of two inches and a half thick. The hollow or bore of theſe wheels ſhould be eleven inches, and about a fourth in diameter, perfectly round, and the edges ſmoothed down. The inward ledge muſt be four inches deep and one thick; but as that thickneſs would make it larger by one inch than the outſide bore of the beams 2, 3, they muſt be cut to the depth of four inches, ſo as to receive it exactly. As the friction would be too great, if the capitals rubbed againſt the beams by the extreme ſtraining of the cordage, which draws them towards theſe beams, that inconvenience may be eaſily remedied by the means of eight friction-wheels, or cylinders of braſs, about the thirteenth of an inch in diameter, and an inch and one ſixth in length, placed circularly, and turning upon axes, as repreſented at E, 13, and D, 12. One of theſe friction-wheels at large with its ſcrew, by which it is faſtened into the beam, is repreſented at B.

Upon this number of cylindrical wheels the capitals 9 muſt be placed in the beams 2, 3, ſo that the cylinders do not extend to the teeth of the wheels, which muſt receive a ſtrong pinion 14. By the means of this pinion the wheel of the capital is made to turn for ſtraining the cordage with the key 15. The capital wheel has a ſtrong catch 16, and another of the ſame kind may be added to prevent any thing from giving way through the extreme and violent force of the ſtrained cordage. Theſe precautions are neceſſary on account of the cylindrical wheels, which, by entirely preventing the friction of the capitals, make them the more eaſy to give way through the extraordinary and almoſt inconceivable tenſion of the cordage.

The capital-piece of the machine is a nut or croſs-pin of iron, 17, ſeen at A, and hammered cold into its form. It divides the bore of the capitals exactly in two equal parts, and fixed in grooves about an inch deep. This piece, or nut, ought to be about two inches and one third thick at the top 18, as repreſented in the ſection at D, and rounded off and poliſhed as much as poſſible, that the cords folded over it may not be hurt or cut by the roughneſs or edges of the iron. Its height ought to be eight inches, decreaſing gradually in thickneſs to the bottom, where it ought to be only one inch. It muſt be very exactly inſerted in the capitals. Its depth of eight inches adds force to the engine, and prevents its giving way through the ſtraining of the cordage. Perhaps its being caſt with the capital, and of the ſame metal, might have an equal, if not a better effect.

After placing the two capitals in the holes of the two beams in a right line with each other, and fixing the two croſs diametrical nuts or pieces, over which the cordage is to wind, one end of the cord is reeved through a hole in one of the capitals in the baſe, and made faſt to a nail within-ſide of the beam. The other ſide of the cord is then carried through the hole in the oppoſite beam and capital, and ſo wound over the croſs-pieces of iron in the centre of the two capitals, till they are full, the cordage forming a large ſkain. The tenſion or ſtraining of the cordage ought to be exactly equal, that is, the ſeveral foldings of the cord over the capital-pieces ſhould be equally ſtrained, and ſo near each other as not to leave the leaſt ſpace between them. As ſoon as the firſt folding or ſkain of cord has filled up one whole ſpace or breadth of the capital-pieces, another muſt be carried over it; and ſo on, always equally ſtraining the end till no more will paſs through the capitals, and the ſkain of cordage entirely fills them, obſerving to rub it from time to time with ſoap.

At three or four inches behind the cordage, thus wound over the capital-pieces, two very ſtrong upright beams 21 are raiſed: theſe are poſts of oak fourteen inches thick, croſſed over at top by another of the ſame ſolidity. As this part of the machine is two or three inches behind the ſkain of cordage, it muſt have a ſmall obliquity towards the cordage, in ſuch a manner that, the arm or tree 22 fixed at the bottom, exactly in the centre of the cordage, half of which holds it on one ſide, and half on the other, it is neceſſary that the arm ſhould ſtrike with ſome obliquity againſt the cuſhion or ſtomacher 23, which muſt be placed exactly in the middle of the croſs-beam 24. Without this obliquity the ſpring of the cordage would be ſomewhat leſſened before the tree reached the croſs-beam. The height of the upright beam 21 is ſeven diameters and a half, and three inches, and each ſupported behind with very ſtrong props, 25, fixed at bottom in the extremities of the baſe 2, 3. The croſs-beam 24 muſt be ſupported in the ſame manner by a prop in the centre. The cuſhion or ſtomacher in the centre ſhould be covered with tanned ox-hide, and ſtuffed with hair, the arm ſtriking againſt it with inconceivable force.

The tree, arm, or ſtylus, as Ammianus Marcellinus calls it, ſhould be of ſound aſh. Its length is from fifteen to ſixteen diameters of the bore of the capitals. The end at the bottom, or that fixed in the middle of the ſkain, is ten inches thick, and fourteen broad. Its edges muſt be ſmoothed off to prevent the fretting of the cordage, the ſkains of which are compoſed of cat-gut.

To ſtrengthen the arm or tree, it ſhould be wrapped round with a cloth dipped in ſtrong glue, like the tree of a ſaddle, and bound very hard with waxed thread of the ſixth of an inch in diameter from the large end at bottom, almoſt to the top, as repreſented in the figure.

At the top of the arm, juſt under the iron-hand or receiver 27, a ſtrong cord is faſtened, with two loops twiſted one within another, for the greater ſtrength. Into theſe two loops the hook of a braſs pulley 28 is put. The cord 29 is then reeved through the pulley, and faſtened to the roll 30. The cock or trigger 31, which ſerves as a ſtay, is then brought to it, and made faſt by its hook to the extremity of the hand 27, in which the body to be diſcharged is placed. The pulley at the neck of the arm is then unhooked, and when the trigger is to let it off, a ſtroke muſt be given upon it with an iron-bar or crow of about an inch in diameter; on which the arm flies up with a force almoſt equal to that of a modern mortar. It is to be obſerved, that the tree or arm deſcribes an angle of ninety degrees, beginning at the cock, and ending at the ſtomacher or cuſhion.

CATARACT, in hydrography, a precipice in the channel of a river, cauſed by rocks, or other obſtacles, ſtopping the courſe of the ſtream, from whence the water falls with a greater noiſe and impetuoſity: ſuch are the cataracts of the Nile, the Danube, Rhine, and the famous one of Magora in America.

Cataract, in medicine and ſurgery, a diſorder of the humours in the eye, by which the pupilla that ought to appear tranſparent and black, looks opaque, grey, blue, brown, &c. by which viſion is variouſly impeded, or totally deſtroyed.

The ordinary and moſt common cauſe of cataracts, is from an opacity in the cryſtalline lens: it appears that it may ſometimes be cauſed by a membrane in the aqueous humours, which cauſe was the only one aſcribed to cataracts till the preſent century.

Cataracts have been diſtinguiſhed by ſurgeons and oculiſts into various ſpecies, as into recent and inveterate, incipient and confirmed, mature and immature, ſimple and complicated, immoveable and ſhaking, milky and purulent, true and ſpurious, and into curable and incurable. There is ſcarce any diſorder, the event of which is more uncertain than that of a cataract: medicines will generally have little or no effect when the diſorder is confirmed, or inveterate, notwithſtanding what ſome may boaſt of their wonderful arcana for this purpoſe: almoſt the ſole relief is therefore had from the ſurgeon's hand and inſtruments. For the proceſs of this operation, ſee the article Couching *of Cataracts.*

Though moſt people reject all methods of treating cataracts by medicines as uſeleſs and trifling, yet there are ſome caſes in this diſorder which ought to be recommended to the care of the phyſicians, who by directing a proper regimen and courſe of phyſic, adapted to the patient's habit, age, and other circumſtances, may by the aſſiſtance of nature remove cataracts beyond expectation.

CATARRH, in medicine, a diſtillation or defluxion from the head upon the mouth and aſpera arteria, and through them upon the lungs.

The cauſe of this diſorder proceeds from the lymph, or maſs of blood, moſt frequently in the winter time, as it commonly ariſes from a cold. If it is attended with a fever, as it almoſt always is, in ſome degree, it is called a catarrhous fever.

The catarrhus ſuffocatius is a violent and ſuffocating cough, excited either by an exceſſive catarrh, or cold; by the rupture of a vomica in the lungs; by a polypus driven from the heart into the pulmonary artery; or ſometimes by a ſpaſmodic conſtitution of the nerves, as it happens in ſome hyſteric caſes.

Catarrhous diſorders, as well as all other feveriſh indiſpoſitions, are to be treated in a mild and gentle manner; and the patient is to be kept moderately warm, either in bed, or by means of a fire: he is to abſtain from medicines which are too hot, draſtic, and productive of commotions; as alſo from a hot regimen. The diet is to be ſpare, and the drink tepid and wholeſome: the moſt proper is excorticated barley, with ſhavings of hartſhorn, raiſins, and liquorice root.

When the effervescence is violent, a few grains of nitre may be advantageouſly mixed with the bezoardic powders; and emulſions muſt be plentifully drank: when during this diſorder the fæces are indurated, and the patient coſtive, beſides water-gruel, decoctions of manna, &c. are to be drank; and nothing is more proper than emollient clyſters.

Some diſtinguiſh catarrhs into three kinds, calling it bronchus, when the humours of the head fall upon the jaws; coryza, when they fall upon the noſtrils; and rheum, when they fall on the breaſt. See the articles Bronchus, Coryza, and Rheum.

CATASTASIS, καταστασις, in poetry, the third part of the ancient drama, being that wherein the intrigue, or action, ſet forth in the epitaſis, is ſupported and carried on, and heightened, till it be ripe for the unravelling in the cataſtrophe. Scaliger defines it, the full growth of the fable, while things are at a ſtand in that confuſion to which the poet has brought them.

CATASTROPHE, in dramatic poetry, the fourth and laſt part in the ancient drama, or that immediately ſucceeding the cataſtaſis: or according to others, the third only; the whole drama being divided into protaſis, epitaſis, and cataſtrophe; or, in the terms of Ariſtotle, prologue, epilogue, and exode.

The cataſtrophe clears up every thing, and is nothing elſe but the diſcovery or winding up of the plot. It has its peculiar place, for it ought entirely to be contained, not only in the laſt act, but in the very concluſion of it; and when the plot is finiſhed, the play ſhould be ſo alſo. The cataſtrophe ought to turn upon a ſingle point, or ſtart up on a ſudden.

The great art in the cataſtrophe is, that the clearing up of all difficulties may appear wonderful, and yet eaſy, ſimple, and natural.

It is a very general, but very prepoſterous artifice of ſome writers to ſhew the cataſtrophe in the very title of the play. Mr. Dryden thinks that a cataſtrophe reſulting from a mere change in ſentiments and reſolutions of a perſon, without any other machinery, may be ſo managed as to be exceeding beautiful. It is a diſpute among the critics, whether the cataſtrophe ſhould always fall out favourably on the ſide of virtue, or not. The reaſons on the negative ſide ſeem the ſtrongeſt. Ariſtotle prefers a ſhocking cataſtrophe to a happy one. The cataſtrophe is either ſimple or complex; the firſt is that in which there is no change in the ſtate of the principal perſons, nor any diſcovery or unravelling, the plot being only a mere paſſage out of agitation into quiet repoſe. In the ſecond, the principal perſons undergo a change of fortune, in the manner already defined.

CATCH, or Catches, in mechanics, thoſe parts which lay hold of others by hooking or catching hold of them.

Catch-Fly, in botany, a name given to the lychnis. See the article Lychnis.

Catch-Word, among printers, that placed at the bottom of each page, being always the firſt word of the following page.

CATECHISM is defined in the Liturgy of the church of England, an inſtitution to be learned of every perſon before he be brought to be confirmed by the biſhop.

The catechiſms of the primitive church, uſually began with the doctrine of repentance and remiſſion of ſins, the neceſſity of good works, and the nature and uſe of baptiſm; then followed the explanation of the ſeveral articles of the creed, to which ſome added the doctrine of the immortality of the ſoul, and an account of the canonical books of Scripture.

The time appointed for catechizing, are Sundays and holidays. Every parſon, vicar, or curate, are enjoined, upon every Sunday and holiday, to teach and inſtruct the youth, and ignorant perſons of his pariſh, in the catechiſm ſet forth in the book of Common-Prayer; and that under the penalty of a ſharp reproof for the firſt omiſſion, ſuſpenſion for the ſecond, and excommunication for the third.

CATECHIST, an officer in the primitive Chriſtian church, whoſe buſineſs it was to inſtruct the catechumens in the firſt principles of religion, and thereby prepare them for the reception of baptiſm.

This office might be performed by an eccleſiaſtic of any order, and it was ſometimes done by the biſhop himſelf.

CATECHU, in the materia medica. See Terra *Japonica*.

CATECHUMEN, a candidate for baptiſm, or one who prepares himſelf for the receiving thereof.

The catechumens, in church hiſtory, were the loweſt order of Chriſtians in the primitive church. They had ſome title to the common name of Chriſtian, being a degree above pagans and heretics, though not conſummated by baptiſm. They were admitted to the ſtate of catechumens by the impoſition of hands and the ſign of the croſs. The children of believing parents were admitted catechumens as ſoon as ever they were capable of inſtruction: but at what age thoſe of heathen parents might be admitted is not ſo clear. As to the time of their continuance in this ſtate, there were no general rules fixed about it; but the practice varied according to the difference of times and places, and the readineſs and proficiency of the catechumens themſelves.

CATEGOREMA, among logicians, denotes much the ſame with predicament or category. See the article Category.

CATEGORICAL, whatever partakes of the nature of a category. Thus, a categorical order requires the ſubſtance to go before the accident. And categorical anſwers are pertinent and preciſe replies to the facts or objections propoſed. See the article Category.

CATEGORY, κατηγορια, in logic, a ſeries or order of all the predicates or attributes contained under any genus.

The ſchool philoſophers diſtribute all the objects of our thoughts and ideas into certain genera or claſſes, not ſo much, ſay they, to learn what they do not know, as to communicate a diſtinct notion of what they do know; and theſe claſſes the Greeks called categories, and the Latins predicaments.

Ariſtotle made ten categories, viz. quantity, quality, relation, action, paſſion, time, place, ſituation, and habit, which are uſually expreſſed by the following technical diſtich.

Arbor, ſex, ſervos, ardore, refrigerat, uſtos
Ruri cras ſtabo, nec tunicatus ero.

But as the ſeries of categories is entirely arbitrary, ſome philoſophers think all nature may be better conſidered under theſe ſeven things; ſpirit, matter, quantity, ſubſtance, figure, motion, and reſt: and others make but two categories, ſubſtance and accident.

CATENARIA, the name of a curve line, formed by a chain or rope, or hanging freely from two points of ſuſpenſion, whether the points be horizontal or not.

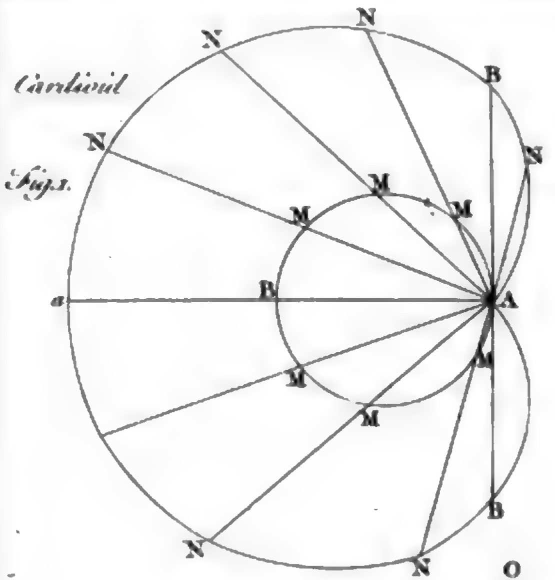
The word is Latin, and derived from *catena*, a chain.

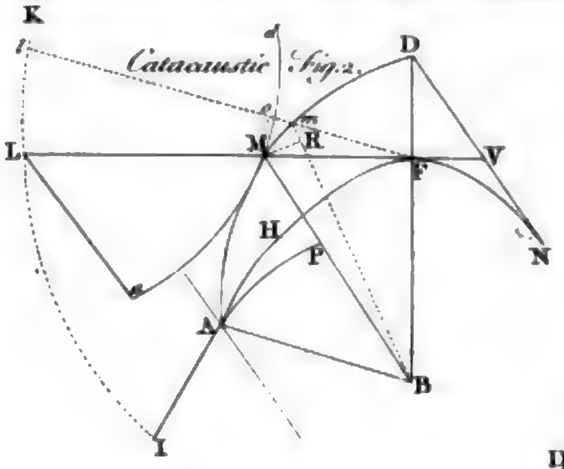
If you ſuppoſe a line heavy and flexible, firmly fixed by its extremes to the points F, D, (pl. XXXV. *fig.* 6.) its weight will bend it into the curve F A D, called the catenaria, whoſe loweſt point (or the vertex of the curve) is A. From A draw A B perpendicular to the horizon, and join the horizontal points F, D. Now, in order to inveſtigate the nature of this curve, we are to find the relation between Bb or $D\delta$, and $d\delta$, ſuppoſing the point b infinitely near to B, and bd parallel to B D, alſo $D\delta$ to B A. From the principles of mechanics, it is plain that three powers, which are in equilibrio, are in proportion to one another, as three right lines parallel to their reſpective directions (or inclined in any given angle to them) and terminated at their mutual interſection; and conſequently, if Dd expounds the abſolute gravity of the particle Dd (as it will be in a catena equally thick) then $d\delta$ will repreſent that part of the gravity which acts perpendicularly upon Dd, and by which it comes to paſs, that dD (being by the flexibility of the chain moveable about d) endeavours to bring itſelf into a vertical poſition: and therefore if δd (or the fluxion of the ordinate B D) be conſtant, the action of the gravity exerted perpendicularly upon the correſpondent parts of the catena Dd, will be conſtant, or every where the ſame. Let this action of force be expounded by a.

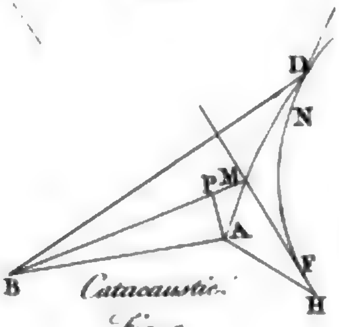
Farther, from the above-cited propoſition in mechanics, $D\delta$, or the fluxion of the axis A B, will expound the force to be exerted in the direction dD, which is equivalent to the former endeavour of Dd, (by which it tends to bring itſelf into a vertical poſition) and is ſufficient to hinder it. But this force ariſes from the *linea gravis*, D A, pulling with the direction dD, and is conſequently (all the reſt continuing as before) proportional to that line D A. Therefore δd, the fluxion of the ordinate, is to δD, the fluxion of the abſciſſa, as the conſtant quantity a, to the curve D A.

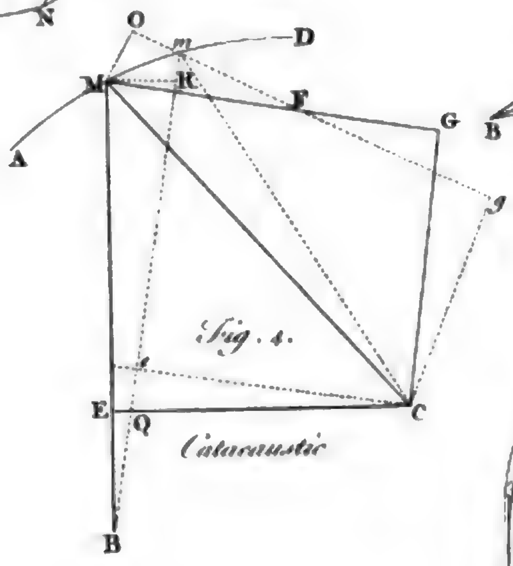
If the right line D T touches the catenaria, and meets the axis A B, produced in T; then will $DB : BT :: d\delta : \delta D :: a : DA$.

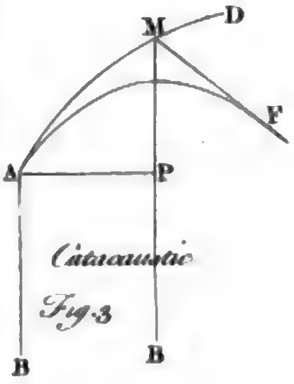
Now, in order to determine the algebraical equation of the catenaria, let an equilateral hyperbola A H, whoſe ſemi-axis $AC = a$, be deſcribed upon the perpendicular A B, as an axis, as alſo upon the ſame axis and vertex, a parabola A P, whoſe parameter is quadruple the axis of the hyperbola; then will B F, (making $HF = AP$) the ſemi-ordinate of the catenaria, be equal to the difference between the length A P of the curve of the parabola, and the ordinate of the hyperbola; for put $AB = x$, then

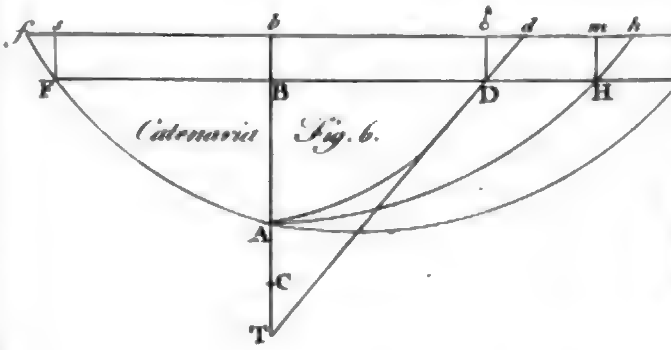

Cardioid
Fig.1.
N
N
N
N
N
N
B
B
B
M
M
M
M
M
M
M
a
A

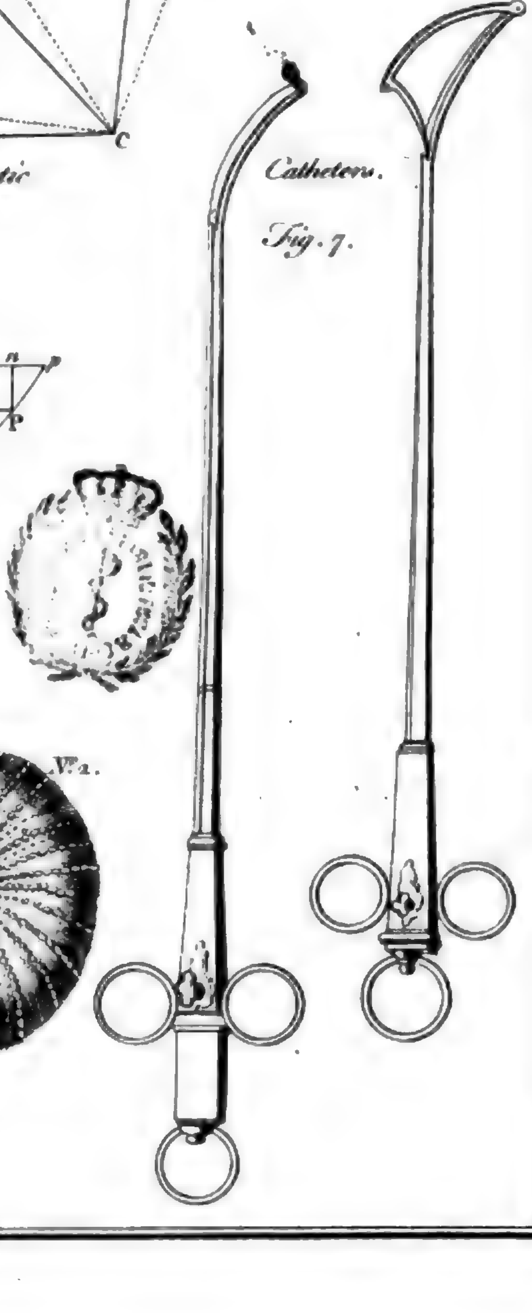

Catacaustic Fig.2.
K
t
d
D
L
M
R
F
V
N
H
P
A
B
I

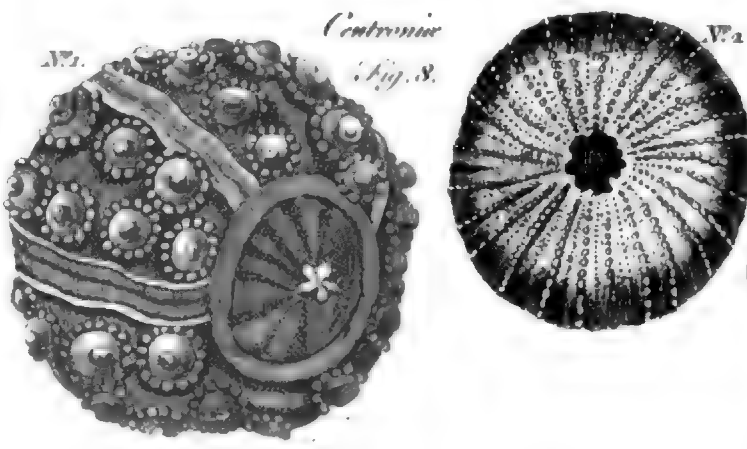

D
N
P
M
A
B
F
H
Catacaustic.
Fig.5.


O
m
D
M
K
F
G
A
g
Fig.4.
E
Q
C
B
Catacaustic


M
D
F
A
P
Catacaustic
Fig.3
B
B


f
e
b
δ
d
m
h
n
p
F
B
D
H
P
Catenaria
Fig.6.
A
C
T


Catheters.
Fig.7.


Centronia
Fig.8.
No.1.
No.2.

$Bb = \dot{x}$ and $BH = \sqrt{2ax+x^2}$; whence mb the fluxion of $BH = \frac{a\dot{x}+x\dot{x}}{\sqrt{2ax+xx}}$. Again, ſince the parabola A P has for its parameter $2a$, B P will be equal to $\sqrt{2ax}$, whoſe fluxion np is $\frac{2a\dot{x}}{\sqrt{2ax}}$: wherefore the fluxion of the curve A P is $\sqrt{\frac{4a^2\dot{x}^2}{2ax}+\dot{x}^2} = \sqrt{\frac{2a\dot{x}^2+x\dot{x}^2}{x}}$, which is equal to $\frac{2a\dot{x}+x\dot{x}}{\sqrt{2ax+x^2}}$, as appears by multiplying both numerator and denominator into $\sqrt{2a+x}$. And ſince H F is every where = A P, the fluxion of H F; that is, $mb+sf$; will be $\frac{2a\dot{x}+x\dot{x}}{\sqrt{2ax+x^2}}$. But we have hitherto found $mb = \frac{a\dot{x}+x\dot{x}}{\sqrt{2ax+x^2}}$; therefore sf (the fluxion of BF, the ordinate in the catenaria) $= \frac{a\dot{x}}{\sqrt{2ax+x^2}}$, and conſequently the fluxion of the curve A F (that is, $Ff = \sqrt{sf^2+Fs^2} = \sqrt{\frac{a^2\dot{x}^2}{2ax+x^2}+\dot{x}^2}$) is $\frac{a\dot{x}+x\dot{x}}{\sqrt{2ax+x^2}}$, the fluent of which was ſhewn above to be $\sqrt{2ax+x^2}$; and therefore $AF = \sqrt{2ax+xx}$. And it is plain, that the fluxion of the ordinate BF, or $\frac{a\dot{x}}{\sqrt{2ax+x^2}}$, is to $\dot{x}$, the fluxion of the abſciſſa A B, as the conſtant quantity a, to the curve A F, which was the property of the catenaria found above. If the ſemi-ordinate of the catenaria be put equal to y; then $\frac{a\dot{x}}{\sqrt{ax+x^2}} = \dot{y}$, and by taking the fluent of each ſide the equation, we ſhall have $a \times \log. \overline{aa+ax+a\sqrt{2ax+x^2}} = y$, which when $x=0$, becomes $a \times \log.\ aa$, but then $y = 0$ alſo; therefore $a \times \log. \overline{aa+ax+a\sqrt{2ax+xx}} - a \times \log.\ aa$. or $a \times \log. \frac{a+x+\sqrt{2ax+xx}}{a} = y$. Let z be put for the length of the curve; then $z = \sqrt{2ax+x^2}$, and conſequently $x = \sqrt{zz+aa} - a$.

CATERPILLAR, *Eruca*, in zoology, the name of the butterfly-claſs of inſects, in their reptile or worm-ſtate.

It is well known that all winged inſects paſs through a reptile ſtate, before they arrive at perfection: this great change from a worm to a fly, or butterfly, was formerly eſteemed a real metamorphoſis of one animal to another; but later diſcoveries have put it beyond all doubt, that the embryo butter-fly, with all the lineaments of its parent, is contained within the external caſes, or coverings, of the caterpillar. When the included animal has acquired a ſufficient degree of ſtrength, theſe coverings are thrown off, and it appears in its genuine or moſt perfect form of a fly, or butter fly. See FLY and BUTTER-FLY.

It is neceſſary, however, before the animal can get rid of theſe coverings, that it paſs through a ſtate of reſt, called by naturaliſts the nymph or chryſalis-ſtate. See the article NYMPH.

Whoever deſires to have a more full account of theſe animals in their reptile and chryſalis-ſtate, may conſult the ſecond volume of Reaumur's Hiſtory of Inſects.

CATERPILLAR-EATERS, ſmall worms bred from the eggs of certain flies, lodged in bodies of larger caterpillars.

CATERPILLAR-SHELL, the Engliſh name of the verrucoſe turbo, with a broad and depreſſed mouth. See TURBO.

CATHÆRETICS, in pharmacy, the ſame with ſarcophagous medicines, or thoſe of a cauſtic nature, ſerving to eat off proud fleſh.

CATHARINE, or *Knights of St.* CATHARINE, a military order, inſtituted for the ſecurity of travellers who come to viſit the tomb of this ſaint. The knights received, as a badge of their dignity, a broken wheel with a ſword ſtained with blood. They took vows to guard the body of this ſaint, to ſecure the roads for pilgrims, to defend the rights of the church, to obey their ſuperiors in all things, and follow the rule of St. Baſil.

CATHARISTÆ, in church hiſtory, a branch of Manichees, ſo called from certain purifications which they were obliged to practiſe: they are alſo ſaid to have held it unlawful to eat fleſh.

CAT-HARPINGS, in naval affairs, ropes which draw in the ſhrouds parallel to the yards, that the yards may be more eaſily braced ſharp for a ſide-wind. *Shipwreck*, p. 107. See the articles BRACE and CLOSE-HAULED.

CATHARTICS, in medicine, remedies which promote evacuation by ſtool. They are the ſame with what are commonly called purgatives.

Cathartics may be divided into two claſſes; 1. The eccoprotic or milder. 2. The draſtic, or rougher. See ECCOPROTIC and DRASTIC.

They are likewiſe divided according as they are ſuppoſed to purge bile, pituita, melancholy, and ſeroſities, into cholagogues, phlegmagogues, melanagogues, and hydragogues. See CHOLAGOGUES, &c.

Cathartics operate by vellicating and irritating the fibres and membranes of the ſtomach and inteſtines. As the periſtaltic motion of the guts is ſuch as propels continually their contents, from the pylorus down to the rectum, every irritation either quickens that motion, in its natural order, or occaſions ſome little inverſion of it; in both, what but ſlightly adheres to the coats, or inner membranes, will be looſened and ſhook off, and carried forwards with the contents; and being alſo more agitated, will be rendered more fluid: hence it appears how a cathartic haſtens and increaſes the diſcharge by ſtools. But the ſame manner of operation carries its effects much farther in proportion to the force of the ſtimulus; for where it is great, the appendices of the bowels, and even all the viſcera in the abdomen, will by a conſent of parts, that is, a communication of nerves, be pulled or twitched, ſo as to affect their reſpective juices, in the ſame manner as the inteſtines themſelves affect their contents. The conſequences, therefore, muſt be, that a great part will be drained back into the inteſtines, and make a part of what they diſcharge. Another way of promoting the diſcharges by ſtool, from fuſion, is to mix ſuch particles with them as prevent their running into viſcid coheſions, and by degrees divide and break them when in contact; whence they are rendered fitter to run off by the moſt convenient outlets.

CAT-HEAD, in naval architecture, a large ſquare piece of timber; one end of it is faſtened upon the forecaſtle, the other end projects without the bow, ſo far as to keep the anchor clear of the ſhip when it is drawing up by a tackle, the block of which is called the cat-block: the rope which paſſes through the ſeveral ſheaves of the block is called the cat-fall. *Murray's Treatiſe on Ship-building, &c.* p. 189.

CATHEDRA, among eccleſiaſtical writers, denotes a biſhop's ſee, or throne.

CATHEDRAL, a church wherein is a biſhop's ſee or ſeat.

A cathedral was originally different from what it is now, the Chriſtians, till the time of Conſtantine, having no liberty to build any temple. By their churches they only meant their aſſemblies; and by their cathedrals, nothing more than conſiſtories.

CATHETER, in ſurgery, a fiſtulous inſtrument, uſually made of ſilver, to be introduced into the bladder, in order to ſearch for the ſtone, or diſcharge the urine when ſuppreſſed.

The catheter may be introduced with much more eaſe in women than in men, as the urethra in the firſt is much ſhorter, wider, and in a ſtraighter courſe.

In both ſexes, however, this inſtrument cannot be eaſily paſſed, but by one that is previouſly acquainted with the anatomical ſtructure of the parts.

To prevent repeating the operation of paſſing the catheter when the retention of urine will follow in a ſhort time, modern ſurgeons have, inſtead of the common or rigid catheter, provided a flexible catheter, made of flatted ſilver, convoluted in a particular manner (as in plate XXXV. *fig.* 7.) to give a continual paſſage to the urine.

M. Le Cat, ſurgeon at Rouen, has likewiſe invented a new ſteel grooved catheter for performing lithotomy, in a manner reſembling that of Celſus, or upon the gripe, two views of which are exhibited in the abovementioned plate and figure; both being one third of the ſize which the inſtrument ought to be made of.

CATHETUS, in geometry, a line or radius falling perpendicularly on another line or ſurface: thus the catheti of a right-angled triangle are the two ſides that include the right angle.

CATHETUS *of Incidence*, in catoptrics, a right line drawn from a point of the object, perpendicular to the reflecting line.

CATHETUS *of Reflection*, or *of the Eye*, a right line drawn from the eye, perpendicular to the reflecting line.

CATHELUS *of Obliquation*, a right line drawn perpendicular to the ſpeculum, in the point of incidence or reflection.

CATHETUS, in architecture, a perpendicular line, ſuppoſed to paſs through the middle of a cylindrical body, as a baluſter, column, &c.

In the Ionic capital, the cathetus is a perpendicular line paſſing through the middle of the eye of the volute.

CATHOLIC, in a general ſenſe, denotes any thing that is univerſal or general.

CATHOLIC CHURCH. The riſe of hereſies induced the primitive Chriſtian church to aſſume to itſelf the appellation of Catholic, being a characteriſtic to diſtinguiſh it from all ſects, who, though they had party-names, ſometimes ſheltered themſelves under the name of Chriſtians.

The Romiſh church diſtinguiſhes itſelf now by the name of Catholic, in oppoſition to all thoſe who have ſeparated from her communion, and whom ſhe conſiders as only heretics and ſchiſmatics, and herſelf only as the true and Chriſtian church. In the ſtrict ſenſe of the word, there is no Catholic church in being; that is, no univerſal Chriſtian community.

CATHOLIC KING, a title which hath been hereditary to the kings of Spain ever ſince Alphonſus, who having gained ſeveral victories over the Saracens, and re-eſtabliſhed the Chriſtian faith in Spain, was honoured with the title of Catholic. Some ſay it was in the time of Ferdinand and Iſabella.

CATHOLICON, in pharmacy, a kind of ſoft purgative electuary, ſo called, as being ſuppoſed an univerſal purger of all humours.

CATKIN, or KATKIN, the ſame with an amentaceous flower. See AMENTACEOUS.

CATLIN, among ſurgeons, a knife for cutting off corrupted parts of the body.

CATOCHE, or CATOCHUS, in medicine, a diſeaſe by which the patient is rendered, in an inſtant, as immoveable as a ſtatue, without either ſenſe or motion, and continues in the ſame poſture he was in at the moment he was ſeized. The proximate cauſe of this diſeaſe is the immobility of the common ſenſory, from the time of the firſt attack, and therefore is an abſolute reſt of the blood in the brain, of the glands of the brain, and of all its emiſſories. This diſeaſe is generally preceded by obſtinate intermitting fevers; by a dry, lean, melancholy temperament of body; by a retention of the menſes and hæmorrhoids; by ſudden frights; by a profound, conſtant, and fixed meditation on one ſubject. It is often cured by exciting a copious hæmorrhage from the noſe; but the particular method of cure is various, according to the different cauſes: the patient ſhould be excited with things that greatly ſtrike the ſenſes, ſuch as light, noiſe, ſtimulating things, volatile ſalts, pain, friction, continual agitations, by promoting the menſtrual flux, by ſternutatories, and emetics, by bliſters, by iſſues, by ſetons, by a moiſtening diet.

It ſeldom changes to any other diſeaſe, and ſometimes it has been ſucceeded by an epilepſy, convulſions, madneſs, or an atrophy, which have ended in death.

CATOPTRICS, that part of optics that treats of reflex viſion, and explains the laws and properties of reflection, chiefly founded upon this truth, that the angle of reflection is always equal to the angle of incidence; and from thence deducing the magnitudes, ſhapes, and ſituations of the appearances of objects ſeen by the reflection of poliſhed ſurfaces, and particularly plane, ſpherical, conical, and cylindrical ones; but this doctrine being a part of optics, ſee the article OPTICS.

CATOPTRIC CISTULA, a machine, or apparatus, whereby ſmall bodies are repreſented extremely large, and near ones extremely wide and diffuſed through a vaſt ſpace, and other agreeable phænomena, by means of mirrors, diſpoſed by the laws of catoptrics, in the concavity of a kind of cheſt.

Of theſe there are various kinds accommodated to the various intentions of the artificer; ſome multiply objects, ſome deform them, ſome magnify, &c.

CATOPTRIC DIAL, a dial that exhibits objects by reflected rays. See the article REFLECTING DIAL.

CATOPTIC TELESCOPE, a teleſcope that exhibits objects by reflection. See the article REFLECTING TELESCOPE.

CATTLE, *Pecora*, an order of quadrupeds, for the characters of which, ſee the article PECORA.

Black CATTLE, the ſame with the ox-kind. See the article BOS.

CATUS-PARDUS, or CATUS MONTANUS, in zoology. See the article CAT *of the Mountain*.

CAVA, or VENA CAVA, in anatomy, a vein ariſing with a large ſinus from the right auricle of the heart. It there ſends out a vein to the heart itſelf, called the coronary vein, and is divided into two trunks, a ſuperior and an inferior; from the ſuperior trunk of the vena cava there ariſe the following veins; the azygos, the bronchial, the mediaſtinal, the ſuperior diaphragmatic, and the ſubclavians: the inferior trunk of the vena cava is remarkable for the valves, and from this ariſe the diaphragmatic, or inferior phrenic veins, the reinal veins, the ſpermatic, the ſacra, and the iliacs. See VEIN, and each of theſe under its proper head.

CAVALIER, in fortification, an elevation of earth, of different ſhapes, ſituated ordinarily in the gorge of a baſtion, bordered with a parapet, and cut into more or leſs embraſures, according to the capacity of the cavalier.

Cavaliers are a double defence for the faces of the oppoſite baſtion: they defend the ditch, break the beſiegers galleries, command the traverſes in dry moats, ſcour the ſaliant angle of the counterſcarpe where the beſiegers have their counter-batteries, and infilade the enemies trenches, or oblige them to multiply their parallels: they are likewiſe very ſerviceable in defending the breach, and the retrenchments of the beſieged, and can very much incommode the intrenchments which the enemy make, being lodged in the baſtion.

CAVALIER, in the menage, one that underſtands horſes, and is practiſed in the art of riding them.

CAVALRY, a body of ſoldiers that charge on horſeback, and may properly be called the right arm of the army: they are of great ſervice in diſturbing the enemy by their frequent excurſions, in intercepting convoys, and deſtroying the country.

The cavalry is divided into ſquadrons, and encamp on the wings of the army. Too great a number of cavalry may prove prejudicial to an army; for as they conſume a great deal of forage, they may oblige a general to decamp from an advantageous poſt.

CAVAZION, or CAVASION, in architecture, denotes the hollow trench made for laying the foundation of a building, which, according to Palladio, ought to be one ſixth part of the height of the whole building.

CAUCALIS, in botany, a genus of plants, the univerſal flower of which is difform and radiated; the proper flower of the diſk is male, ſmall, compoſed of five inflexocordated equal petals; the proper flower of the radius is hermaphrodite, and compoſed of five inflexocordated unequal petals, the exterior one being larger than the reſt and bifid: the fruit is of an oblato-oblong figure, ſtriated longitudinally, with rigid ſcabrous briſtles: the ſeeds are two, oblong, convex on one ſide and armed with prickles in order of the ſtriæ, and plane on the other ſide.

CAUDA, in a general ſenſe, denotes the tail of an animal. See the article Tail.

Cauda Draconis, the dragons-tail, in aſtronomy, the name of the moon's deſcending node. See the article Node.

Cauda Leonis, in aſtronomy, a ſtar of the firſt magnitude in the tail of the conſtellation Leo. See the article Leo.

CAVEAR, or Caveer, or Caviary, the ſpawn, or hard roes of ſturgeon, made into ſmall cakes, an inch thick, and of an hand's breadth, ſalted, and dried in the ſun. This ſort of food is in great repute throughout Muſcovy, becauſe of their three Lents, which they keep with a ſuperſtitious exactneſs; wherefore the Italians ſettled at Moſcow drive a very great trade in this commodity throughout that empire, becauſe there is a prodigious quantity of ſturgeon taken at the mouth of the Wolga, and of the other rivers which fall into the Caſpian ſea. There is a pretty large quantity of this commodity conſumed in Italy; and they are very well acquainted with it in England and France, where it is reckoned no deſpicable diſh.

The French and Italians get the cavear from Archangel, but they ſeldom get it at the firſt hand, for they commonly buy it of the Engliſh and Dutch.

CAVEAT, in law, a kind of proceſs in the ſpiritual courts, to ſtop the proving of a will, the granting letters of adminiſtration, &c. to the prejudice of another. See Probate.

It is alſo uſed to ſtop the inſtitution of a clerk to a benefice.

CAVEATING, in fencing, is the ſhifting the ſword from one ſide of that of your adverſary to the other.

CAVEDO, in commerce, a Portugueſe long meaſure, equal to 27, $\frac{114}{1000}$ Engliſh inches.

CAVERNOSE, among anatomiſts, an appellation given to ſeveral parts of the body, on account of their ſpongy ſtructure: thus the cavernoſa corpora of the penis are two ſpongy bodies, made up of a number of ſmall caverns or cells. Theſe are the two bodies which conſtitute the penis; they ariſe diſtinct and ſeparate on each ſide of the oſſa pubis, as it were from peculiar thalami: after this they join, and, in that original ſtate, are carried into the glans. If any liquid matter be impelled into theſe, or if they be inflated, the penis becomes rigid. Theſe two bodies are alſo termed corpora ſpongioſa.

CAVESON, or Cavezon. See the article Cavezon.

CAVETTO, in architecture, a hollow member, or round concave moulding, containing a quadrant of a circle, and having a quite contrary effect to that of a quarter-round. It is uſed as an ornament in cornices.

Mr. Felibien takes notice, that workmen confound the cavetto with a ſcotia, but improperly, the cavetto being in fact only half a ſcotia. See the article Scotia.

CAVEZON, in the menage, a ſort of noſeband, either of iron, leather, or wood, ſometimes flat, and at other times hollow or twiſted, clapped upon the noſe of a horſe, to wring it, and ſo forward the ſupplying and breaking of the horſe.

An iron cavezon is a ſemicircle or band of iron, conſiſting of two or three pieces joined by hinges, and mounted with a head-ſtall, a throat-band, and two ſtraps or reins, with three rings; one rein paſſes through the middle ring, when we mean to make a horſe work round a pillar; through the two ſide-rings we paſs the two reins, which the rider holds in his hand, or makes faſt to the ſaddle, in order to keep the horſe's head in ſubjection, &c.

CAVIN, in the military art, a natural hollow, fit to lodge a body of troops: if there happen to be any near a place beſieged, it is of great uſe to the beſiegers; for by the help of ſuch a place they can open the trenches, make places of arms, or keep guards of horſe, without being in danger of the enemy's ſhot.

CAUK, or Cawk, a term uſed among miners, for a coarſe ſparry ſtone, of a white colour, found in the lead-mines. See the article Spar.

CAUL, in anatomy, a membranaceous part of the abdomen, covering the greateſt part of the guts, uſually furniſhed with a large quantity of fat, placed under the peritonæum, and immediately over the inteſtines, called by ſome authors rete, or reticulum, from the number of holes appearing in it, when raiſed, and giving it the reſemblance of a net: but it is moſt frequently called omentum. See the article Omentum.

Caul is alſo a little membrane, found on ſome children, encompaſſing the head when born.

Some take this to be only a fragment of the membranes of the fœtus, which generally break at the birth of the child.

CAULICOLES, or Caulicoli, are eight leſſer branches or ſtalks, in the Corinthian capital, ſpringing out from four greater or principal cauls, or ſtalks.

The eight volutes of this order are ſuſtained by four cauls, or primary branches of leaves, and from which theſe caulicoles, or leſſer foliages ariſe.

CAULIFEROUS, an appellation given to ſuch plants as have a perfect caulis, or ſtem. See the article Caulis.

CAULIFLOWERS, in gardening, are the produce of a kind of cabbage, and have of late years been ſo far improved in England, as to exceed in ſize and goodneſs any that are raiſed in the reſt of Europe; they are in ſeaſon in the months of May, June, and July, but the ſkill of the gardener can continue them much longer. The manner of propagating them is this:

Having procured ſome good ſeed, you muſt ſow it before the middle of Auguſt, upon an old cucumber or melon bed, ſifting earth over the ſeeds to a quarter of an inch in thickneſs: if the weather prove very hot and dry, the beds muſt be ſhaded with mats, and be lightly watered at times. In about a week's time the ſeeds will appear above ground, and they muſt be uncovered by degrees, but not expoſed to too much ſun at firſt. In about a month more they ſhould be pricked out on another old bed, at three inches diſtance, and ſhaded and watered, when firſt tranſplanted; but after this they muſt not be much watered, nor be ſuffered to have too much rain, which will make them black-ſhanked, or rotten in the ſtalks. In this bed they are to remain till the middle of October, when they are to be planted out for the winter ſeaſon: they are then to be planted out in rich beds, and thoſe which are to be early ripe, are to be ſhaded with bell-glaſſes, two under each glaſs, and in February to be planted out again: the reſt are to be at firſt ſet at a greater diſtance, and to ſtand.

When the cauliflowers begin to fruit, they muſt be carefully watched, and ſome of the inner leaves muſt be bent down over the flower, to ſhade it from the ſun, which would otherwiſe turn it yellow. The very fineſt of the cauliflowers, which are not looſe and frothy about the edges, and very firm, ſhould be ſaved for ſeed; and the flower ſtems, as they ſhoot out, ſupported with ſticks till the ſeeds are ripened, which muſt then be carefully gathered and dried for uſe. *Miller's Gard. Dict.*

CAULINE, in a general ſenſe, denotes any thing belonging to the caulis or ſtalk of plants. See the article Caulis.

Cauline Leaf, among botaniſts, that growing from the ſtalk of a plant.

CAULIS, among botaniſts, denotes the ſtalk of herbaceous plants: this, in trees, is called *caudex*, or trunk; and, in graſſes, *culmus*, or ſtem.

CAULKING, amongſt ſhipwrights, the act of driving a quantity of oakum, i. e. old ropes untwiſted and ſoftened, into the ſeams of the planks, or between them where they are joined, in order to keep out the water: after the oakum is driven very hard into theſe ſeems, it is covered with hot melted pitch, to prevent the water from rotting it.

Causa Matrimonii Prælocuti, in common law, a writ that lies where a woman gives land to a man in fee, to the intent he ſhall marry her, and he refuſes to do it in a reaſonable time, being thereunto required by the woman: and in ſuch caſe, for not performing the condition, the entry of the woman into the lands again has been adjudged lawful.

The huſband and wife may ſue this writ againſt another who ought to have married her.

Causa Nobis Significes, in law, a writ directed to the mayor of a town, &c. who being by the king's writ commanded to make ſeiſin of lands to the king's grantee, delays ſo doing. This writ requires him to ſhew cauſe why he makes delay.

CAUSALTY, among metaphyſicians, the action or power of a cauſe in producing its effect.

It is a diſpute among the ſchool-philoſophers, whether and how the cauſalty is diſtinguiſhed from the cauſe and the effect? Some hold it a mode or modal entity, ſuperadded to the cauſe, &c. others contend for its being the cauſe itſelf. See the article Cause.

Causalty, among miners, denotes the lighter, ſulphureous, earthy parts of ores, carried off in the operation of waſhing.

This, in the mines, they throw in heaps upon banks, which, in ſix or ſeven years, they find it worth their while to work over again. See Ore and Washing.

CAUSE, *Cauſa*, that from whence any thing proceeds, or by virtue of which any thing is done: it ſtands oppoſed to effect. We get the ideas of cauſe and effect, ſays Mr. Locke, from our obſervation of the viciſſitude of things, while we perceive ſome qualities or ſubſtances begin to exiſt, and that they receive their exiſtence from the due application and operation of other beings. That which produces is the cauſe, and that which is produced, the effect: thus fluidity in wax is the effect of a certain degree of heat, which we obſerve to be conſtantly produced by the application of ſuch heat.

Firſt Cause, that which acts of itſelf, and of its own proper power or virtue: God is the only firſt cauſe in this ſenſe.

Second Causes, are thoſe which derive the power and faculty of action from a firſt cauſe: theſe are improperly called cauſes, in regard they do not, ſtrictly ſpeaking, act at all, but are acted on: of this kind are all thoſe that we term natural cauſes.

Philoſophers are divided as to the action whereby ſecond cauſes produce their effects: ſome maintain, that the cauſalty cannot be produced, ſince it is that which produces: others will have them to act truly by their action; but they are at a loſs ſtill about that action: ſome do not allow that corporeal ſubſtances can produce any thing but accidents: the ſyſtem of Aviſenna is, that God produces, immediately, a moſt perfect ſpiritual ſubſtance; this produces another, leſs perfect; that, a third; and thus to the laſt; which laſt produces all the corporeal ſubſtances; and thoſe corporeal ſubſtances, accidents: as to the manner of their agency, ſome maintain, that the ſubſtantial form of ſecond cauſes produces forms, and the accidental ones, accidents: others, that forms produce other forms accidents; and others, that accidents alone are capable of producing accidents and forms.

Cauſes are diſtinguiſhed, by the ſchools, into efficient, material, final, and formal.

Efficient Causes are the agents employed in the production of any thing.

Material Causes, the ſubjects whereon the agents work, or the materials whereof the thing is produced.

Final Causes are the motives inducing an agent to act; or the deſign and purpoſe for which the thing was done.

Lord Bacon ſays, that the final cauſe is ſo far from being ſerviceable, that it corrupts the ſciences, unleſs it be reſtrained to human actions: however, continues he, final cauſes are not falſe, nor unworthy of inquiry in metaphyſics: but their excurſions into the limits of phyſical cauſes hath made a great devaſtation in that province; otherwiſe, when contained within their own bounds, they are not repugnant to phyſical cauſes.

Formal Cause, the change reſulting from the action; or that which determines a thing to be this, and diſtinguiſhes it from every thing elſe: thus, the ſoul is held the formal cauſe of man.

Cauſes are again diſtinguiſhed into phyſical and moral.

Phyſical Cause, that which produces a ſenſible corporeal effect; as the ſun is the phyſical cauſe of light: others define it, that which produces its effect by a phyſical virtue.

The Carteſians reſolve all phyſical cauſes into occaſional ones.

Occaſional Causes, therefore, are only the occaſions, not the direct cauſes of their effects. See the article Occasion.

The ſoul, ſay theſe philoſophers, is not able to act on the body, nor the body reciprocally on the ſoul: to keep up an intercourſe between them, God, on occaſion of the motion of the body, impreſſes a ſenſation on the ſoul, and on occaſion of a ſentiment of the ſoul, impreſſes a motion on the body: the motions therefore of the ſoul and body are only occaſional cauſes of what paſſes in the one or in the other: thus, ſay they, the ſtroke or percuſſion is only the occaſional cauſe of the motion produced in the body ſtruck: it is God who is the direct efficient cauſe, &c.

Moral Cause, that which produces a real effect, but in things immaterial; as repentance is the cauſe of forgiveneſs. A moral cauſe is alſo defined, that which determines us, though not neceſſarily to do, or not to do any thing; as advice, intreaties, commands, menaces, &c.

It is to be obſerved, that in this ſenſe, a moral cauſe is only applicable to a free intelligent agent: it is alſo obſervable, that the latter notion of a phyſical, as well as a moral cauſe, is the moſt juſt, clear, and diſtinct.

Cauſes are again diſtinguiſhed into univerſal, or particular; principal, or inſtrumental; total, or partial; univocal, equivocal, &c.

Cause, among civilians, the ſame with action. See Action.

CAUSEWAY, or **Causey**, a maſſive body of ſtones, ſtakes, and faſcines; or an elevation of fat viſcous earth, well beaten; ſerving either as a road in wet marſhy places, or as a mole to retain the waters of a pond, or prevent a river from overflowing the lower grounds.

CAUSTICS, in phyſic, an appellation given to medicines, of ſo hot and fiery a nature, that being applied, conſume, and, as it were, burn the texture of the parts like hot iron.

Cauſtics differ from cauteries, in that they perform their effects ſlower, and with leſs force and pain: they are uſed to eat off proud fungous fleſh; they alſo penetrate within hard callous bodies, and liquify the humours; and are particularly applied in abſceſſes and impoſthumations, to eat through to the ſuppurated matter, and give it vent; ſometimes alſo to make iſſues, in parts where cutting is difficult or inconvenient.

Cauſtics are generally divided into four ſorts, the common ſtronger cauſtic, the common milder cauſtic, the antimonial cauſtic, and the lunar cauſtic.

The ſtronger cauſtic is prepared, by boiling to a fourth part any quantity of the lees of almond-ſoap, adding lime, that has been kept in a veſſel pretty cloſe ſtopt for ſeveral months; the lime is to be added till all the liquor is abſorbed, and the whole reduced to a paſte, which is to be kept in a veſſel well ſtopt.

The common milder cauſtic is prepared, by taking equal parts of ſoft ſoap, and freſh quick-lime, and mixing them at the time of uſing.

The antimonial cauſtic is prepared thus: take of antimony one pound, of corroſive ſublimate, two pounds; and being reduced ſeparately into powder, mix them well, and diſtil them in a retort with a wide neck, in a gentle heat of ſand; let what aſcends into the neck of the retort be expoſed to the air, that it may run into a liquor.

The method of preparing the lunar cauſtic is as follows: diſſolve pure ſilver by a ſand-heat, in about twice its weight of aquafortis; then dry away the humidity with a gentle fire; afterwards melt it in a crucible, that it may be poured into proper moulds, carefully avoiding over much heat, leſt the matter ſhould grow too thick.

Caustic Curve, in the higher geometry, a curve found by the concourſe or coincidence of the rays of light, reflected from ſome other curve. Se Catacaustic and Diacaustic.

Caustic Glasses, the ſame with burning-glaſſes. See Burning-Glass.

CAUSUS, or Burning-Fever, a ſpecies of continual fever, accompanied with a remarkable inflammation of the blood. The principal ſymptoms are a heat almoſt burning to the touch, the breath extremely hot, a dryneſs of the whole ſkin, the tongue parched and rough, and an unquenchable thirſt. See Fever.

CAUSWAY, or Causeway. See the article Causeway.

CAUTERIZATION, the application of cauteries to any part of the body. See the next article.

Cauterization with moxa is wonderfully extolled by ſome as the moſt effectual means to extirpate the gout; but it is at preſent in diſuſe, and not without reaſon; for, beſides the acute pain which it creates, it is frequently found to have little or no effect. This cauterization, however, is ſaid to be at preſent in uſe among the Arabians; and the Japoneſe and Chineſe have it in ſo great eſteem, that it makes one of their chief remedies.

CAUTERY, in ſurgery, a medicine for burning, eating, or corroding any ſolid part of the body.

Cauteries are diſtinguiſhed into two claſſes, actual and potential: by actual cauteries are meant red-hot inſtruments, uſually of iron, which are applied to many parts and diſorders; and by potential cauteries are underſtood certain kinds of corroding medicines. See the article Caustics.

Cauteries have manifold uſes; for they not only deſtroy the dead parts of carious bones, remove cancers, ſchirri, excreſcencies, carbuncles, and mortified parts; but they are alſo uſed to make iſſues and ſetons, to ſtop hæmorrhages in wounds and amputations; and laſtly, to remove an amauroſis, epilepſy, ſciatica, with pains in the teeth and other parts.

For the right application of cauteries, various obſervations are neceſſary: 1. The ſize and figure of the cautery ſhould correſpond to that of the diſordered part. 2. It is neceſſary to ſecure the ſound parts from the cautery, to prevent giving more than neceſſary pain. 3. When the inſtrument is ſufficiently hot, it is to be applied, and ſtrongly impreſſed upon the diſordered part, till the bottom of it appears ſound. To effect this more ſpeedily, it will be neceſſary to have ſeveral cauteries in readineſs, a caution more eſpecially to be obſerved in carious bones and large hæmorrhages.

Several phyſicians have obſerved, that cauteries have ſucceeded in apoplexies when all other remedies have failed. But for the part to which the cautery is to be applied, there are various opinions; ſome prefer the occiput; ſome the nape of the neck, between the firſt and ſecond vertebræ; ſome the meeting of the coronal and ſagittal ſutures; and others pitch upon other parts. Miſtichellius, an Italian writer, aſſerts, that no part can be ſo proper for cauterizations in apoplexies, as the ſoles of the feet.

CAUTING-IRON, in farriery, an iron with which farriers cauterize or ſear thoſe parts of an horſe that require burning.

CAUTION, *Cautis*, in the civil and Scotch law, denotes much the ſame with what, in the law of England, is called bail. See the article Bail.

CAUTIONE Admittenda, in law, a writ which lies againſt a biſhop that holds an excommunicated perſon in priſon for contempt, after he has offered ſufficient caution or ſecurity to obey the orders of the church. On receipt of this writ, the ſheriff warns the biſhop to take caution.

CAXOU, among miners, denotes a cheſt of any ore ready prepared for refining.

CAZEMATE, or Casemate, in fortification, a certain retired platform in the flank of a baſtion, for the defence of the moat and face of the oppoſite baſtion. Sometimes there are three ſuch platforms one behind another, the uppermoſt of which is on the terre plein of the baſtion, which makes the other two be called *places baſſes*, or low places. They are covered from the enemy's batteries by a work of earth added to the angle of the ſhoulder, of a circular and ſometimes of a ſquare form, called ſhoulder, orillon, or epaulement. See Orillon, &c.

It is very ſeldom that cazemates are uſed now a-days, becauſe the enemies batteries are apt to bury the cannon they contain under the ruins of their vaults; beſides that, the ſmoke with which they are continually filled, renders them inſupportable to the engineers. It is for this reaſon that the latter engineers make them open at top, contenting themſelves with fortifying them with a parapet.

Cazemate is alſo uſed for a well with ſeveral ſubterraneous branches dug in the paſſage of the baſtion, till the miner is heard at work, and air given to the mine.

CAZERN. See the article Casern.

CEDAR, in botany, a large tree which puſhes out branches at the diſtance of ten or twelve feet from the ground. They are large, and at a diſtance from each other. Its leaves are pretty much like thoſe of roſemary. It is an ever-green, and lives very long, but dies as ſoon as its top is cut off. The leaves ſtand upright, and the fruit hangs down; that fruit is a ſmaller one, like that of the pine-tree, except that its rind is thinner, ſmoother, and more open. The ſeed is like that of the cypreſs-tree.

There are ſtill ſome cedars on Mount Libanus, but in ſmall number, above and to the eaſt of Biblos and Tripoli. There are none to be ſeen any where elſe on thoſe mountains. But it is very probable that there were a great many more formerly, ſince their timber was uſed in ſo many conſiderable works. There are ſome cedars alſo growing in ſeveral parts of Africa, in the Iſle of Cyprus, and in that of Crete or Candia. Joſephus, the Jewiſh hiſtorian, aſſerts, that Solomon planted ſo large a quantity of cedars in Judea, that they were as numerous as the ſycomore-trees, which are very common in that country.

Mr. Miller obſerves, that what we meet with in the Scripture of the lofty cedars, can be no ways applicable to the ſtature of this tree; ſince by the experience of thoſe we have now growing in England, as alſo from the teſtimony of ſeveral travellers who have viſited thoſe few remaining trees on Mount Libanus, they are not inclined to grow very lofty, but, on the contrary, extend their branches very far: to which the alluſion made by the Pſalmiſt agrees very well, when he is deſcribing the flouriſhing ſtate of a nation: "They ſhall ſpread their branches like the cedar-" trees."

The wood of this famous tree is accounted proof againſt all putrefaction of animal bodies. This wood is alſo ſaid to yield an oil, which is famous for preſerving books and writings; and the wood is thought, by lord Bacon, to continue above a thouſand years ſound. It is likewiſe recorded, that, in the temple of Apollo at Utica, there was found timber of near two thouſand years old. And the ſtatue of the goddeſs, in the famous Epheſian temple, was ſaid to be of this material alſo, as was moſt of the timber-work of that glorious ſtructure.

This ſort of timber is very dry, and ſubject to ſplit; nor does it well endure to be faſtened with nails; therefore pins of the ſame wood are much preferable.

The cedar brought from Barbadoes and Jamaica is a ſpurious ſort, of ſo porous a nature, that the wine will leak through it. That produced in New-England is a lofty grower, and makes excellent planks, and flooring that is everlaſting. They ſhingle their houſes with it, and uſe it in all their buildings. This is the oxycedrus of Lycia, which Vitruvius deſcribes as having its leaves reſembling thoſe of cypreſs.

Baſtard **Cedar**, in botany, the Engliſh name of the theobroma. See the article Theobroma.

White **Cedar**, a name given to a ſpecies of cupreſſus. See Cupressus.

CEDRIA, among phyſicians, the gum or reſin which iſſues from the cedar. Its good qualities conſiſt in its being fat, thick, tranſparent, and that, when poured out, it falls by equal drops.

CEILING, in architecture, the upper part or roof of a room, being a lay or covering of plaſter over laths, nailed on the bottom of the joiſts which bear the floor of the upper room, or on joiſts put up for that purpoſe, where there is no upper room; hence called ceiling joiſts.

Theſe plaſtered ceilings are much uſed in England, more than in any other country: nor are they without their advantages, as they make the room lightſome, are good in caſe of fire, &c.

CELANDINE, *Chelidonium*, in botany. See the article CHELIDONIUM.

CELARENT, in logic, a mode of ſyllogiſm, wherein the major and concluſion are univerſal negative propoſitions, and the minor an univerſal affirmative. As

CE No man that is a hypocrite can be ſaved:
LA Every man who with his lips only cries Lord, Lord, is a hypocrite:
RENT Therefore, no man who with his lips only cries Lord, Lord, can be ſaved.

CELASTRUS, in botany, a genus of plants, whoſe corolla conſiſts of five equal, oval, patent, ſeſſile petals, with their ends turned back: the fruit is a coloured, oval capſule, obtuſely trigonal, gibbous, formed of three valves, and containing three cells, in each of which are ſmall, oval, coloured ſeeds, ſmooth, and half covered by a calyptra, which is alſo coloured, and has an unequal rim, divided into four ſegments.

CELERITY, in mechanics, the ſwiftneſs of any body in motion.

It is alſo defined to be an affection of motion, by which any moveable body runs through a given ſpace in a given time. See VELOCITY and MOTION.

CELESTINS, in church-hiſtory, a religious order of Chriſtians, reformed from the Bernardins by pope Celeſtin V. Their rules are divided into three parts; the firſt, of the provincial chapters, and the elections of ſuperiors; the ſecond contains the regular obſervances; and the third, the viſitation and correction of the monks.

The celeſtins riſe two hours after midnight to ſay matins: they eat no fleſh at any time, except when they are ſick: they faſt every Wedneſday and Friday, to the feaſt of the exaltation of the Holy-croſs; and from that feaſt to Eaſter, every day.

CELIAC, or COELIAC PASSION, a ſort of diarrhœa, or flux of the belly, wherein the aliment comes away either crude or chylified, inſtead of excrements. See the article COELIAC.

CELIBACY, the ſtate of unmarried perſons, to which, according to the doctrine, or at leaſt the diſcipline, of the church of Rome, the clergy are obliged.

In the church of England, the marriage of the clergy was generally practiſed to the end of the tenth age, and in a great meaſure to the beginning of the twelfth.

That celibacy has no pretence of divine or apoſtolical inſtitution, ſeems no difficult point to prove: whence it is, at firſt, hard to conceive from what motive the court of Rome perſiſted ſo very obſtinately to impoſe this inſtitution on the clergy. But we are to obſerve, that this was a leading ſtep to the execution of the project formed of making the clergy independent of princes, and rendering them a ſeparate body, to be governed by their own laws. In effect, while prieſts had children, it was very difficult to prevent their dependence upon princes, whoſe favours have ſuch an influence on private men; but having no family, they were more at liberty to adhere to the pope.

CELIDOGRAPHY, κηλιδογραφια, a deſcription of the ſpots viſible in the faces of the ſun or planets. We have a treatiſe under this title by Branchini.

CELL, *Cella*, a little apartment or chamber, ſuch as thoſe wherein the ancient monks, ſolitaries, and hermits, lived in retirement.

Cells are ſtill retained in divers monaſteries. Thus the dormitory is frequently divided into ſo many cells. The Carthuſians have each a ſeparate houſe, which ſerve them as a cell.

The hall wherein the Roman conclave is held, is divided by partitions into divers cells for the ſeveral cardinals to lodge in.

CELLS are alſo the little diviſions in honeycombs, which are always regular hexagons. See COMB.

CELLS, in botany, the hollow places between the partitions in the pods, huſks, and other ſeed-veſſels of plants; according as there is one, two, three, &c. of theſe cells, the veſſel is ſaid to be unilocular, bilocular, trilocular, &c.

CELLS, in anatomy, little bags or bladders where fluids or other matters are lodged, called loculi, cellulæ, &c.

CELLAR, the loweſt room in a houſe, the ceiling of which is level with the ſurface of the ground on which the houſe ſtands, or at moſt but very little higher.

As to the ſituation of cellars, Sir Henry Wotton ſays, they ought, unleſs the whole houſe be cellared, to be ſituated on the north ſide of the houſe, as ſtanding in need of a cool and freſh air.

CELOSIA, in botany, a genus of plants, the flower of which conſiſts of five lanceolated, acuminated, erect, rigid, and permanent petals; the fruit is a globoſe capſule, ſurrounded with a corolla, with one cell opening horizontally, and containing ſeveral roundiſh emarginated ſeeds.

CELSIA, in botany, a genus of plants, the flower of which is monopetalous, with a plain limb and roundiſh ſegments: the fruit is a roundiſh capſule, compreſſed at the top, acuminated, adhering to the cup, with two cells, containing ſeveral ſmall angulated ſeeds.

CEMENT, or CÆMENT, in a general ſenſe, any glutinous ſubſtance capable of uniting and keeping things together in cloſe coheſion.

Cements require to be of very various compoſitions, and different with reſpect to the nature of the ingredients, according to the different manner in which they are to be applied, and the ſubſtances they are to conjoin. The kinds of cement uſed for common purpoſes paſs under the denomination of glue, ſize, paſte, and lutes. See GLUE, SIZE, PASTE, and LUTES.

The cement which has been moſt approved for uniting glaſs, china, or earthen ware, as alſo the parts of metalline bodies, where ſodering is not expedient, is thus prepared:

"Take two ounces of good glue, and ſteep it for a night in diſtilled vinegar: boil them together the next day; and having beaten a clove of garlic with half an ounce of ox-gall, into a ſoft pulp, ſtrain the juice thro' a linen cloth, uſing preſſure, and add to it the glue and vinegar. Take then of ſanderac powdered, and turpentine, each one dram, and of ſarcocol, and maſtic, powdered, each half a dram; and put them into a bottle with an ounce of highly rectified ſpirit of wine. Stop the bottle; and let the mixture ſtand for three hours in a gentle heat; frequently ſhaking it. Mix this tincture alſo with the glue while hot; and ſtir them well together with a ſtick or tobacco-pipe, till part of the moiſture be evaporated; and then take the compoſition from the fire, and it will be fit for uſe. When this cement is to be applied, it muſt be dipped in vinegar; and then melted in a proper veſſel with a gentle heat; and when ſtones are to be cemented, it is proper to mix with it a little powdered tripoli or chalk; or when glaſs is to be conjoined, powdered glaſs ſhould be ſubſtituted."

For the uniting the parts of broken china or earthenware veſſels, as alſo glaſs where the rendering the joint viſible is not of conſequence, the following compoſition, which is much more eaſily prepared, may be ſubſtituted for the foregoing:

"Take an ounce of Suffolk cheeſe, or any other kind devoid of fat, grate it as ſmall as poſſible, and put it, with an equal weight of quick-lime, into three ounces of ſkimmed milk: mix them thoroughly together, and uſe the compoſition immediately."

Where the broken veſſels are for ſervice only, and the appearance is not to be regarded, the joints may be made equally ſtrong with any other part of the glaſs, by putting a ſlip of thin paper, or linen, ſmeared with this cement over them, after they are well joined together by it. This method will make a great ſaving in the caſe of glaſſes employed for chemical, or other ſimilar operations.

Drying oil with white lead is alſo frequently uſed for cementing china and earthen-ware; but where it is not neceſſary the veſſels ſhould endure heat or moiſture, iſinglaſs glue, with a little tripoli or chalk, is better.

The preparation of common cement for joining alabaſter, marble, porphyry, or other ſtones, is this:

"Take of bees-wax two pounds, and of reſin one pound; mix them, and add one pound and a half of the ſame

ſame

PLATE XXVI. Facing Camera Obscura.

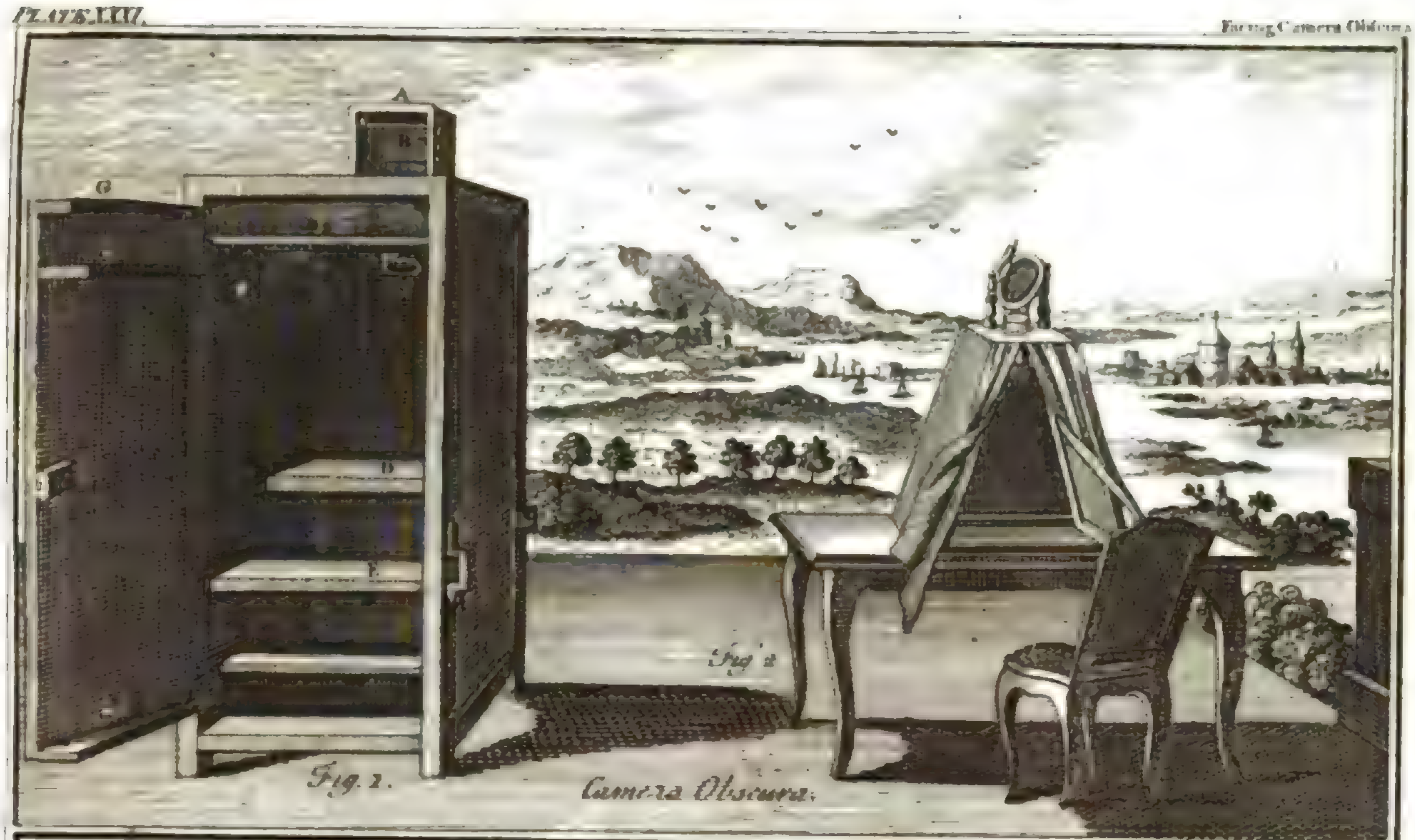


Fig. 1. Camera Obscura. Fig. 2

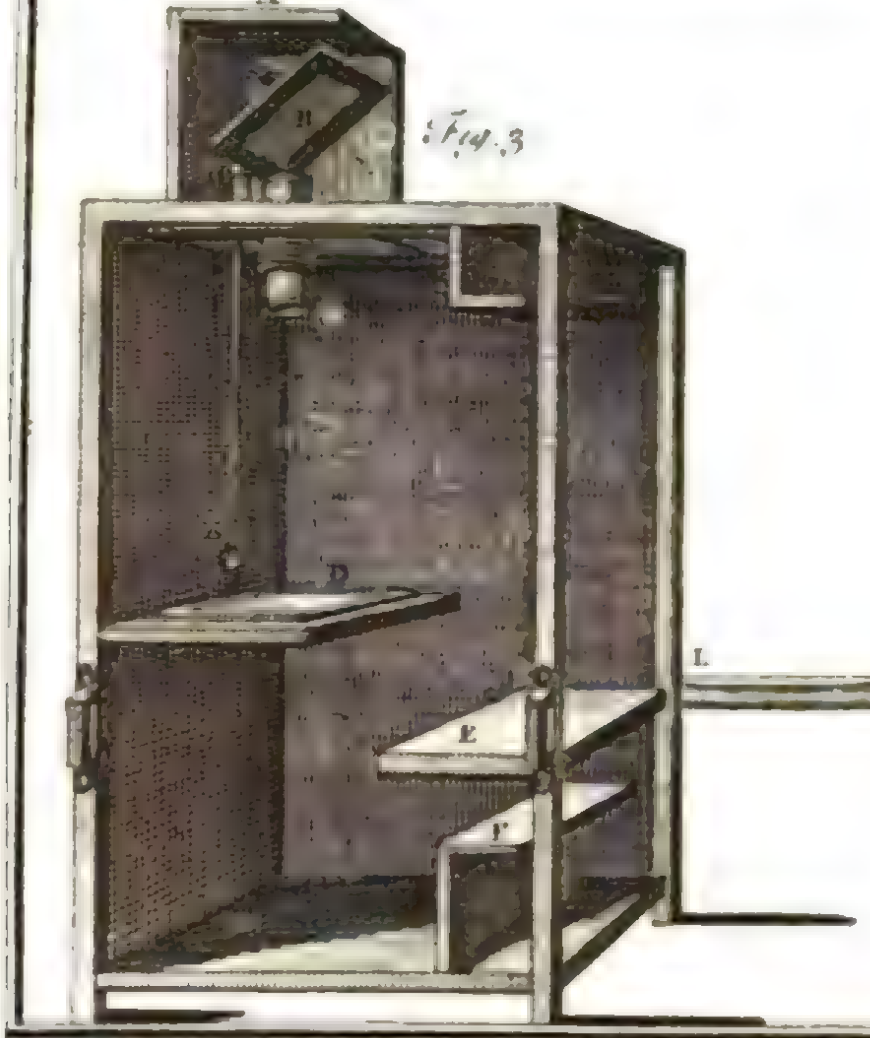


Fig. 3

Fig. 4

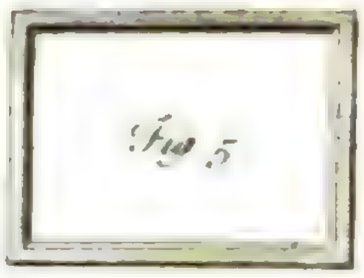
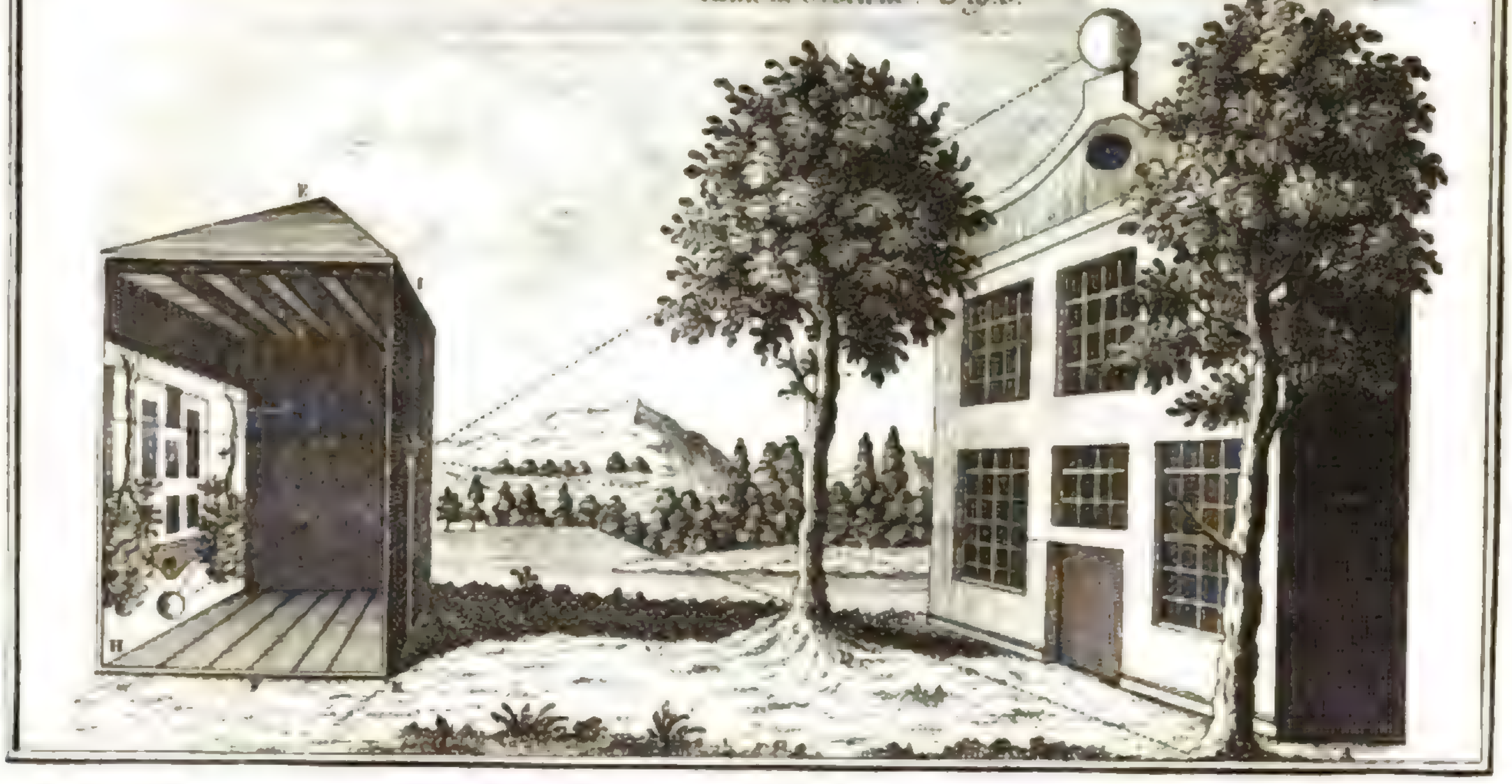


Fig. 5



Camera Obscura. Fig. 6.

ſame kind of matter powdered, as the body to be cemented is compoſed of; ſtrewing it into the melted mixture, and ſtirring them well together; and afterwards kneading the maſs in water, that the powder may be thoroughly incorporated with the wax and reſin. The proportion of the powdered matter may be varied, where required, in order to bring the cement nearer to the colour of the body on which it is employed."

This cement muſt be heated when applied; as muſt alſo the parts of the ſubject to be cemented together; and care muſt be taken likewiſe that they be thoroughly dry.

When this compoſition is properly managed, it forms an extremely-ſtrong cement, which will even ſuſpend a projecting body of conſiderable weight, when it is thoroughly dry and ſet; and is therefore of great uſe to all carvers in ſtone, or others who may have occaſion to join together the parts of bodies of this nature.

A variety of compoſitions are uſed as cements for rock-work, reſervoirs, and other ſuch purpoſes, in the application of which, regard ſhould be had to the ſituation where they are employed with reſpect to moiſture and dryneſs, as well as to the magnitude of the bodies to be conjoined together, or the vacuities or fiſſures that are to be made good.

Where a great quantity of cement is wanted for coarſer uſes, the coal-aſh mortar, or Welſh tarras, as it is called, is the cheapeſt and beſt, and will hold extremely well, not only where it is conſtantly kept wet, or dry; but even where it is ſometimes dry and at others wet; but where it is liable to be expoſed to wet and froſt, it ſhould, at its being laid on, be ſuffered to dry thoroughly before any moiſture have acceſs to it; and, in that caſe, it will likewiſe be a great improvement to temper it with the blood of any beaſt.

This mortar, or Welſh tarras, muſt be formed of one part lime, and two parts of well ſifted coal-aſhes; and they muſt be thoroughly mixed by being beaten together: for on the perfect commixture of the ingredients, the goodneſs of the compoſition depends.

Where the cement is to remain continually under water, the true tarras is commonly uſed, and will very well anſwer the purpoſe. It may be formed of two parts of lime, and one part of plaſter of Paris; which ſhould be thoroughly well beaten together, and then uſed immediately.

For the fixing ſhells, and other ſuch nice purpoſes, putty is moſt generally uſed: but it may be formed of quick-lime, and drying oil, mixed with an equal quantity of linſeed oil; or, where the drying quicker is not neceſſary, it may be made with lime and crude linſeed oil, without the drying oil.

The ſtone cement, prepared as above of the bees-wax and reſin, is alſo an extremely good compoſition for this purpoſe: but reſin, pitch, and brick-duſt, in equal parts, melted together and uſed hot, are much the cheapeſt cement for ſhell-work; and will perform that office very well, provided the bodies they are to conjoin be perfectly dry when they are uſed.

CEMENTATION, or Cæmentation, in a general ſenſe, the corroding of metals in a dry form, by means of the fumes of acid ſalts.

It is performed in the following manner.—After the copper has been ſeparated as much as poſſible by copelling, a ſtratum of ſalts of about half an inch in thickneſs is ſpread in the bottom of the cement-pot; over this are laid thin plates of gold, then another ſtratum of ſalts, and ſo on alternately till the pot be filled within half an inch of the brim. This being done, the pot is covered up, and encompaſſed with fire, which ſhould be made gradually fiercer and fiercer; and in ſixteen or twenty hours after they have been red-hot, entirely removed, that every thing may cool by degrees. Then the pots are to be opened, the ſalts taken out, and if it is grown too hard, to be ſoftened by a ſprinkling of hot water. The plates of gold muſt be waſhed in hot water, and the water renewed, till it be free from all ſaline taſte; for the ſalts, together with the metal they have corroded, will be contained in the plates of gold. The gold muſt be tried with the touch-ſtone, or ſome more certain method, to know if it has the degree of fineneſs required; and if it is not pure enough, it muſt be cemented a ſecond time, and, if neceſſary, with ſtronger ſalts.

CEMETERY, *Coemeterium*, a place conſecrated, or ſet apart, for burying the dead. See the article Coemetery.

CENEGILD, an expiatory mulct that was formerly paid by one who killed another, to the kindred of the deceaſed.

CENOBITE, or Coenobite. See the article Coenobite.

CENOTAPH, κενοταφιον, in antiquity, a monument erected in honour of the dead, but not containing any of their remains. Of theſe there were two ſorts. One erected for ſuch perſons as had been honoured with funeral rites in another place; and the ſecond ſort, for thoſe that had never obtained a juſt funeral.

The ſign whereby honorary ſepulchres were diſtinguiſhed from others, was commonly the wreck of a ſhip, to denote the deceaſe of the perſon in ſome foreign country.

CENSER, a ſacred inſtrument made uſe of in the religious rites of the ancients. It was a vaſe, containing incenſe to be uſed in ſacrificing to the gods. There is the repreſentation of one in Montfaucon's antiquities, under the figure of a ſhallow cup with a lid to it, and chains running through ſmall handles. Cenſers were likewiſe in uſe among the Jews, as we find in 1 Kings vii. 50. "Solomon, when he prepared furniture for the "temple of the Lord, among other things made cenſers "of pure gold." The cenſer is alſo uſed in Romiſh churches.

CENSOR, in Roman antiquity, a magiſtrate, whoſe buſineſs it was to reform the manners, and to value the eſtates of the people.

There were two cenſors firſt created in the 311th year of Rome, upon the ſenate's obſerving that the conſuls were generally ſo much taken up in military actions, as to have no leiſure to attend to private affairs. At firſt they were choſen out of the ſenate, but after the Plebeians had got the conſulate open to them, they ſoon arrived at the cenſorſhip. The cenſors degraded ſenators upon occaſion, made the *princeps ſenatus*, inſpected the management of private families relating to education and expence; and, in ſhort, had authority to reprimand and correct any irregularity, and to take care that perſons, both in public and private capacity, behaved themſelves in a becoming manner. Cicero reduces their functions to the numbering of the people, the correction and reformation of manners, the eſtimating the effects of each citizen, the proportioning of taxes, the ſuperintendence of tribute, the excluſion from the temples, and the care of the public places.

The office was ſo conſiderable, that none aſpired to it till they had paſſed all the reſt; ſo that it was looked on as ſurpriſing, that Craſſus ſhould be admitted cenſor, without having been either conſul or pretor. It was held at firſt for five years; but Mamercus Æmilius ſhortened the term to eighteen months.

After the cenſors were elected in the comitia centurialia, they proceeded to the Capitol, where they took an oath not to manage either by favour or diſaffection, but to act equitably and impartially through the whole courſe of their adminiſtration: and notwithſtanding their great authority, they were obliged to give an account of their management to the tribunes and ædiles curules. In proceſs of time, the dignity of this office dwindled very much; under the emperors it ſunk to nothing, as their majeſties engroſſed all the branches of that juriſdiction. The republic of Venice has at this day a cenſor of manners of their people, whoſe office laſts ſix months.

Censors *of Books* are a body of doctors or others eſtabliſhed in divers countries to examine all books before they go to the preſs, and to ſee they contain nothing contrary to faith and good manners.

CENSURE, a judgment which condemns ſome book, perſon, or action, or more particularly a reprimand from a ſuperior. Eccleſiaſtical cenſures are penalties by which, for ſome remarkable miſbehaviour, Chriſtians are deprived of the communion of the church, or prohibited to execute the ſacerdotal office.

CENSUS, among the Romans, was an authentic declaration,

claration, made by the ſeveral ſubjects of the empire, of their reſpective names and places of abode, before proper magiſtrates in the city of Rome, called cenſors, and in the provinces cenſitors, by whom the ſame were regiſtered.

This declaration was accompanied with a catalogue, or enumeration, in writing, of all the eſtates, lands, and inheritances they poſſeſſed; their quantity, quality, place, wives, children, tenants, domeſtics, ſlaves, &c.

The cenſus was inſtituted by king Servius, and was held every five years. It went through all the ranks of people, though under different names: that of the common people was called cenſus, or luſtrum; that of the knights, cenſus, recenſio, recognitio; that of the ſenators, lectio, relectio.

Hence, alſo, cenſus came to ſignify a perſon who had made ſuch a declaration; in which ſenſe it was oppoſed to incenſus, a perſon who had not given in his eſtate or name to be regiſtered.

The cenſus among the old Romans was held, as is commonly thought, every five years; but this muſt not be taken to be preciſely true: on the contrary, Dr. Middleton has ſhewn, that both the cenſus and luſtrum were, for the moſt part, held irregularly and uncertainly, at very different and various intervals of time.

The cenſus was an excellent expedient for diſcovering the ſtrength of the ſtate: by it they learned the number of the citizens, how many were fit for war, and who for offices of other kinds; how much each was able to pay of taxes towards the charge of the war.

The cenſus, according to Salmaſius, was peculiar to the city of Rome. That in the provinces was formerly called profeſſio; but this diſtinction is not every where obſerved by the ancients themſelves.

CENT, ſignifies properly a hundred, being an abridgement of the word centum; but it is often uſed in commerce, to expreſs the profit or loſs ariſing from the ſale of any commodity: ſo that when we ſay there is 10 per cent. profit, or 10 per cent. loſs, upon any merchandize that has been ſold, it is to be underſtood, that the ſeller has either gained or loſt ten pounds on every hundred pounds of the price at which he bought that merchandize, which is $\frac{1}{10}$ of profit, or $\frac{1}{10}$ of loſs, upon the total of the ſale.

To gain 100 per cent. or cent. per cent. in trade, is the doubling of one's capital: to loſe 50 per cent. is to loſe one half of it.

Cent is alſo uſed in the trade of money, and ſignifies the benefit, profit, or intereſt of any ſum of money which is laid out for improvement.

Thus we ſay, money is worth 4 or 5 per cent. upon exchange; that is to ſay, it brings 4 or 5 pounds profit for every hundred pounds laid or lent out.

Cent is alſo uſed with regard to the draughts or remittances of money made from one place to another. Thus we ſay, it will coſt 2 $\frac{1}{2}$ per cent. to remit money to ſuch a city.

When we ſay that a broker, or exchange-agent, takes one eighth per cent. fee or perquiſite, for the contracts or bargains that are made by his means and interpoſition, it is to be underſtood, that there is to be paid to him the eighth part brokerage of a pound, which is 2 *s.* 6 *d.* for every hundred pounds he cauſes to be negociated. The one eighth per cent. is commonly paid by both the contracting parties; that is to ſay, by him who gives, and by him who receives the money; ſo that the brokers have $\frac{2}{8}$ or $\frac{1}{4}$ per cent. for every bargain, which amount to 5 *s.* or $\frac{1}{4}$ of a pound for every 100 *l.* and 2 *l.* 10 *s.* for every 1000 *l.*

CENTAUR, or Hippocentaur, in ancient poetry, denotes a fabulous kind of animal, half man, half horſe.

The Theſſalians, who firſt taught the art of breaking horſes, appearing on horſe-back to make only one body with the animal on which they rode, gave riſe to the fiction of the hippocentaur.

Centaur, *Centaurus*, in aſtronomy, a conſtellation of the ſouthern hemiſphere commonly joined with the wolf, and called *centaurus cum lupo.* The number of ſtars in this conſtellation in Ptolemy's catalogue are 19; in Tycho's 4; and in the Britannic catalogue 13.

CENTAURIUM *Majus*, great centaury, in botany, a large plant, with the leaves compoſed of oblong ſerrated ſegments ſet in pairs on a middle rib, which is edged, in the intermediate ſpaces, with a ſerrated margin: the ſtalk divides, towards the upper-part, into ſeveral branches, bearing on the tops round ſoft ſcaly heads, from which come forth bluiſh floſculi, followed by down incloſing the ſeeds. It is perennial, a native of the ſouthern parts of Europe, and raiſed with us in gardens.

The root of this plant, of a dark blackiſh colour on the outſide, is internally reddiſh, and yields, when freſh, a juice of a deep red. It has a ſlight ſmell, not agreeable; and in chewing diſcovers a viſcous ſweetneſs and roughneſs, with ſo medegree of acrimony. It is reckoned aperient and corroborant, and ſuppoſed to be particularly uſeful in alvine fluxes; in which intention it has by ſome been greatly recommended, though apparently much inferior to the root whoſe place it was employed to ſupply, to wit, the true rhapontic. Among us it has long ſtood diſcarded from practice, and is now dropped by the colleges both of London and Edinburgh.

Centaurium *Minus*, leſſer centaury, in botany, a ſmall plant, with three-ribbed, ſomewhat oval leaves, ſet in pairs on the ſtalks; which divide, towards the top, into ſeveral branches, bearing umbel-like cluſters, of bright red, funnel-ſhaped flowers, cut into five acute ſegments, followed by little oblong capſules full of very ſmall ſeeds. It is annual, grows wild in dry paſture grounds, and flowers in July.

The leaves and tops of centaury are ſtrong bitters, of ſcarcely any ſmell or particular flavour. The ſeeds alſo are very bitter; the petala of the flowers, and the roots, almoſt inſipid. The flowery tops are generally made choice of, and are of conſiderable eſtimation in the preſent practice as corroborant ſtomachic bitters.

The active parts of this plant are diſſolved readily both by water and rectified ſpirit, the herb, after infuſion in ſufficient quantities of either menſtruum, remaining inſipid: infuſions of the leaves in water are of a paler or deeper browniſh colour, according as they are leſs or more ſaturated: to rectified ſpirit, the freſh leaves give a dark browniſh red tincture. All theſe liquors are ſufficiently elegant bitters.

Water takes up, along with the bitter, a large quantity of an inſipid mucilaginous ſubſtance; whereas rectified ſpirit ſeems to diſſolve little more than the pure bitter part. Hence, on inſpiſſating the two ſolutions to the ſame conſiſtencies, the watery extract proves much leſs bitter than the ſpirituous, and its quantity above four times greater: according to Cartheuſer's experiments, an ounce of the herb yields with water above half an ounce of extract, but with ſpirit ſcarcely half a dram or two ſcruples. *Lewis's Hiſtory of the Materia Medica.*

CENTER, or Centre, in a general ſenſe, ſignifies a point equally diſtant from the extremities of a line, figure, or body.

The word is formed from the Greek, *κεντρον*, a point.

Center *of Attraction*, in the new aſtronomy, is that point towards which the revolving planet or comet is impelled or attracted by the impulſe of gravity.

Center *of a Baſtion* is a point in the middle of the gorge of a baſtion, from whence the capital line commences, which is generally at the inner polygon of a figure.

Center *of a Battalion* is the middle of a battalion, where there is generally left a ſquare place for holding the cloaths and baggage.

Center *of a Circle* is a point within the ſame, from whence all lines drawn to the circumference are equal.

Center *of a Conic Section* is the point where all the diameters meet.

Center *of a Dial* is that point where a line drawn parallel to the axis of the earth interſects the dial planes.

Center *of an Ellipſis* is that point where the tranſverſe and conjugate diameters interſect each other.

Center *of the Equant*, in the old aſtronomy, a point in the line of the aphelion, being ſo far diſtant from the center of the eccentric towards the aphelion, as the ſun is from the center of the eccentric towards the perihelion.

Center *of Gravity* is that point about which all the parts of a body, in any ſituation, balance each other.

This center of gravity in bodies is of the greateſt conſequence to be well underſtood, as being the ſole principle of all mechanical motions. The particular properties hereof are as follows: 1. If a body be ſuſpended by this point, as the center of motion, it will remain at reſt in any poſition indifferently. 2. If a body be ſuſpended in any other point, it can reſt only in two poſitions, viz. when the ſaid center of gravity is exactly above or below the ſaid point of ſuſpenſion. 3. When the center of gravity is ſupported, the whole body is kept from falling. 4. Becauſe this point has a conſtant endeavour to deſcend to the center of the earth; therefore, 5. When this point is at liberty to deſcend, the whole body muſt alſo deſcend or fall, either by ſliding, rolling, or tumbling down. 6. The center of gravity in regular, uniform, and homogenial bodies, as ſquares, circles, ſpheres, &c. is the middle point in a line connecting any two oppoſite points or angles. 7. In a triangle it is in a line drawn from any angle biſecting the oppoſite ſide, one third of the length diſtant from that ſide or baſe. 8. In human bodies, the center of gravity is ſituated in that part which is called the pelvis, or in the middle, between the hips.

Hence the ſolution of ſeveral very curious phænomena will be evident with the leaſt attention, as why ſome bodies ſtand more firmly on their baſes than others; why ſome ſtand firmly in an inclined poſition; why ſome bodies fall in one manner, ſome in another; why ſome may ſeem to riſe while the center of gravity really deſcends, as the rolling cone and cylinder. Hence the form of that particular bucket which deſcends empty with the mouth downwards, but is drawn up full with the mouth upwards. Hence alſo it appears that a waggon loaded with heavy matter, as iron, ſtone, &c. will go ſafely on the ſide of a hill, or riſing ground, where a load of hay or corn would be overturned. Again, we hence ſee the reaſon why no man ſtanding ſtill, can move or ſtir, without firſt moving the center of gravity out of its place; alſo, why we ſtand firmly, while the center of gravity falls between or on the baſe line of the feet; and how neceſſarily we fall when the center of gravity falls on one ſide or other of the ſame; with many other particulars which reſult from this principle.

Problem. To find the center of gravity of a plane figure. Let A B be the axis and M N (pl. XXXVI. *fig.* 1.) an ordinate to it, and let *m n* be another infinitely near M N; ſuppoſe C the required place of the center of gravity. Now if the infinitely ſmall parts, as M *m n* N of the figure be conceived as ſo many weights appended to the axis A B at the ſeveral points P, *p*, &c. and the point of ſuſpenſion be in A the vertex of the figure, the diſtance of the center of gravity C from A, the point of ſuſpenſion, will be equal to the quotient of the diviſion of the ſum of the momenta of all the ſaid infinitely ſmall parts or weights M *m n* N by the ſum of all thoſe little parts or weights; that is, by the area of the whole figure.

Therefore calling A P, x, M P, y, P p, $\dot{x}$, the infinitely ſmall part or weight M *m n* N will be $= 2y\dot{x}$, and the ſum of them equal to the fluent of $2y\dot{x}$. Again, the momentum of one of thoſe infinitely ſmall parts or weights will be $2y\dot{x}$, multiplied by A P $(x) = 2yx\dot{x}$. The fluent of which, divided by the fluent of $2y\dot{x}$, will be equal to A C, the diſtance of the center of gravity from A, the vertex of the figure.

Example 1. To find the center of gravity of a triangle A D E, draw the right line A B (*fig.* 1.) biſecting the baſe D E in B; then becauſe the triangle A B D $=$ A B E, each of them may be reſolved into an infinite number of little parts or weights M *m p* P, P N *n p*, each equal to one another on either ſide the line A B taken as an axis; and conſequently the center of gravity C muſt be ſomewhere in the ſaid line A B.

Now call A B, a, D E, b; A P, x, M N, y; and draw A F perpendicular to D E, which call c; then ſince the triangles A M N, A D E, are ſimilar, A B (a) : D E (b) :: A P (x) : M N $= \frac{bx}{a}$. Alſo becauſe the triangles A P Q, A B F, are ſimilar; therefore A B (a) : A F (c) :: A P (x) : A Q $= \frac{cx}{a}$. And as A P (x) : A Q $\left(\frac{cx}{a}\right)$ :: P p $(\dot{x})$: Q $q = \frac{c\dot{x}}{a}$. Whence the momentum $yx\dot{x}$ will be $= \frac{cbx^2\dot{x}}{a^2}$, the fluent of which is $\frac{cbx^3}{3a^2}$; which being divided by $\frac{cbx^2}{2a^2}$, the area of the triangle A D E, the quotient will be $\frac{2}{3}\dot{x} =$ diſtance of the center of gravity of the part A M N of the triangle A D E from the vertex; and ſubſtituting a for x, the diſtance of the center of gravity of the whole triangle A D E, from the vertex A, will be $= \frac{2}{3}$ A B (a).

Examp. 2. To determine the center of gravity C in the common parabola. (*fig.* 3.)

Calling A P, x, M N, y, and A B, a, and the parameter p; then will $px = yy$, and ſo $y = \sqrt{px}$. Whence $y\dot{x} = \dot{x}\sqrt{px}$; and ſo the momentum $y\dot{x}x = x\dot{x}\sqrt{px} = p^{\frac{1}{2}}xx^{\frac{1}{2}}\dot{x}$, the fluent of which is $\frac{2}{5}p^{\frac{1}{2}}x^{\frac{5}{2}}$, but the fluent of $y\dot{x} = \frac{2}{3}p^{\frac{1}{2}}x^{\frac{3}{2}} =$ area of the portion A M N of the parabola; therefore, dividing $\frac{2}{5}p^{\frac{1}{2}}x^{\frac{5}{2}}$ by $\frac{2}{3}p^{\frac{1}{2}}x^{\frac{3}{2}}$, the quotient will be $\frac{3}{5}x =$ A C, and ſubſtituting a for x, the diſtance of the center of gravity C from the vertex A will be equal to $\frac{3}{5}$ of A B.

Examp. 3. To determine the center of gravity of a right cone and pyramid. See plate XXXVII. *fig.* 1.

The center of gravity will be in the axis A B.

Now, if A P $= x$, and B C $= a$, and A B $= b$, we ſhall have P M $= \frac{ax}{b}$. And the ratio of the radius to the periphery being that of r to p, the fluxion of the weight will be $\frac{pa^2x^2\dot{x}}{2rb^2}$, and the momentum of it $\frac{pa^2x^3\dot{x}}{2rb^2}$: conſequently the ſum of the momentums $\frac{pa^2x^4}{8rb^2}$, divided by the ſum of the weights $\frac{pa^2x^3}{6rb^2}$, will give us $\frac{3}{4}x =$ AG, the diſtance of the center of gravity of the part A M P m of the cone, and ſo $\frac{3}{4}$ A B is the diſtance of the center of gravity of the whole cone from the vertex A.

If two bodies A and B (plate XXXVI. *fig.* 4.) be connected together, by a wire or chain A B, they will each of them affect the other by their gravitating on the line A B, and alſo every particle of that line will be affected with thoſe gravities, or be carried downwards, but with an unequal force, except one, on which the force of each body is equal: and ſince the force of any body A or B ariſes from its quantity of matter multiplied into its velocity, it is evident that one particle muſt be ſo ſituated at C, that B : A (:: v : V) :: A C : B C. Becauſe then we have B × V $=$ A × $v =$ B × A C $=$ A × B C; or the product of each body into its velocity is the ſame at the point C, but no other.

The point C is therefore called the common center of gravity of both the bodies. If the diſtance between the centers of the bodies be given, and the magnitude of each, the diſtance of the point C from either may be thus found, as B + A : B :: A C + B C ($=$ A B) : A C. Let A repreſent the earth, and B the moon, then will A : B :: 40 : 1, nearly; and ſince A B $=$ 60 ſemi-diameters of the earth, we have 40 + 1 : 1 :: 60 : $\frac{60}{41} =$ A C; and ſince a ſemi-diameter contains about 4000 miles, we have $\frac{60 \times 4000}{41} =$ 5854 $=$ A C, from whence, taking one ſemi-diameter A G $=$ 4000, there will remain G C $=$ 1854 miles, for the diſtance of the point C from the earth's ſurface.

Since the earth and moon act on each other by attraction, it is evident they muſt both revolve about the common center of gravity C, whence this point C, and not the center of the earth A, is that which the moon regards in her periodical revolutions; and were there no other bodies in the heavens but the earth and moon, this common center of gravity C would be at reſt, or a fixed point.

But ſince the large body of the ſun commands (by the ſame power of attraction) the earth and moon to revolve about itſelf, it will follow that the point C is that which muſt deſcribe the circle (or magnus orbis) about the ſun, becauſe no other point between A and B can keep always at the ſame diſtance from the ſun, on account of the mutual revolution of thoſe bodies about that point at the ſame time they are carried about the ſun.

But to illuſtrate this matter farther, let S (p.XXXVII. *fig.* 2.) be the ſun, and CDEF a part of the earth's annual orbit, A and B the earth and moon in her conjunction at C in her quadrature at D, in her oppoſition at E, and in her laſt quarter at F, during all theſe motions from C to F, it is evident the center of the earth deſcribes an irregular curve ADAF, but the center of the moon one much more ſo, as being at very unequal diſtances from the ſun S, continually increaſing and decreaſing; and that the point C is that alone which is at an equal diſtance at all times, and therefore deſcribes the circular orbit about the ſun.

The common center of a ſyſtem of bodies may be eaſily found, thus; let a, b, be two weights hanging at the rod AB (p.XXXVI. *fig.* 5.) and ſuppoſe D the place of their common center of gravity, then we have $AD \times a = DB \times b$, by the property of the common balance, whence $AD : DB :: b : a$, and $AD + DB : AD :: a+b : b$, that is, $AB : AD :: b+a : a$; therefore $AD = \frac{AB \times b}{a+b}$. Again, let c be another weight appended at C, and let a and b be transferred to D; then to find the point E, the common center of gravity of the three propoſed weights, we have $CE \times c = ED \times a+b \therefore EC : ED :: a+b : b$, and $EC + ED : ED :: a+b+c : c$, that is, $CD : ED :: a+b+c : c$, and $ED = \frac{CD \times c}{a+b+c}$, $AE = AD - ED = \frac{AB \times b}{a+b} - \frac{CD \times c}{a+b+c}$; but $AD - AC = CD$, and $CD \times c = \frac{AB \times bc}{a+b} - AC \times c$; therefore

$$AE = \frac{AB \times b \times \overline{a+b+c} - AB \times bc + AC \times cb}{\overline{b+a} \times \overline{a+b+c}} + \frac{AC \times ac}{\overline{b+a} \times \overline{a+b+c}} = \frac{AB \times b + AC \times c}{a+b+c}$$

In the ſame manner, if p be another weight beſides the former, all ſuſpended in equilibrio in the point Q, we ſhall find $AQ = \frac{AB \times b + AC \times c + AP \times p}{a+b+c+p}$. Hence it appears that the ſum of the products of the weights by their reſpective diſtances from A (the point of ſuſpenſion) divided by the ſum of all the weights gives the diſtances of their common center of gravity from the point A.

The common center of gravity of the ſun and planets may be eaſily found by comparing their quantity of matter and diſtances, thus; let ABC (*fig.* 2.) repreſent the ſun's body, and S its center. Now ſince the bulks and diſtances of the four firſt planets, Mercury, Venus, the earth, and Mars, are very inconſiderable in regard of the ſun, they would not, if placed in the right line CG, remove the common center of gravity between the ſun and themſelves far from the center of the ſun, ſuppoſe to L. But when we come to Jupiter, his bulk and diſtance give him a conſiderable momentum, which will, if placed in the ſame line CG, remove the center of gravity from L to I, a point without the ſurface of the ſun's body. Laſtly, if we conſider Saturn placed in the line CG with all the reſt, though his quantity of matter falls ſhort of, yet his diſtance far exceeds that of Jupiter, and therefore his momentum will be conſiderable enough to bring the common center of gravity from I to K, at ſuch a diſtance CK from the ſun's ſurface, as is equal to $\frac{1}{10}$ of the ſun's ſemi-diameter SC; or $SC : CK :: 10 . 1$. Now it is this point K, which is the fixed and immoveable center of the ſyſtem, about which the ſun, as well as all the planets, continually move. But the ſun being always very near it, and its diſtance therefrom varying with the different poſitions of the planets, the motion of the ſun about the common center K will be very irregular and unequal, while that of the planets, on account of their great diſtance, may be eſteemed nearly uniform and circular.

If the two bodies A and B (*fig.* 4.) move to or from each other in the ſame right line AB, with velocities proper to their quantities of matter inverſely, the common center of gravity C will remain at reſt, becauſe their diſtances from it will by that means be always in the ſame ratio, viz. of their maſſes inverſely, which is the only thing that make that point the center of gravity between them. But if both bodies move in two different planes, either in the ſame or different directions, the center of gravity C would deſcribe a right-line, and with a velocity of the ſame ſort as that with which the bodies themſelves move.

CENTER *of Magnitude* is that point which is equally diſtant from all the external parts of the body.

CENTER *of Motion* is that point which remains at reſt while all the other parts of the body move about it.

CENTER *of Oſcillation.* See *Center of* OSCILLATION.

CENTER *of Percuſſion.* See *Center of* PERCUSSION.

CENTER *of a Parallelogram*, or *Polygon*, the point in which its diagonals interſect.

CENTER *of a Sphere*, a point in the middle, from which all lines drawn to the ſurface are equal.

Hermes Triſmegiſtus defines God an intellectual ſphere, whoſe center is every where, and circumference no where.

CENTESIMATION, a milder kind of military puniſhment, in caſes of deſertion, mutiny, and the like, when only every hundredth man is executed.

CENTIPES, in zoology, the ſame with the ſcolopendra. See SCOLOPENDRA.

CENTNER, among metallurgiſts and aſſayers, denotes a weight diviſible firſt in an hundred, and afterwards into other leſſer parts. However, it is to be obſerved, that the centner of metallurgiſts, is the ſame with the common hundred weight; whereas that of aſſayers is no more than one dram, to which the other parts are proportional, and nevertheleſs paſs by the names 100 ℔. 64 ℔. &c.

CENTO, in poetry, a work wholly compoſed of verſes or paſſages, promiſcuouſly taken from other authors, only diſpoſed in a new form and order.

Proba Falconia has written the life of Jeſus Chriſt in centos, taken from Virgil: Alexander Roſs has done the like in his Chriſtiados, and Stephen de Pleure the ſame.

Auſonius has laid down rules to be obſerved in compoſing centos: the piece, ſays he, may be taken from the ſame poet, or from ſeveral; and the verſes may be either taken entire, or divided into two; one half to be connected with another half taken elſewhere: but two verſes are never to be uſed running, nor much leſs than half a verſe taken.

CENTRAL, ſomething relating to a center. See the article CENTER.

CENTRAL *Forces.* See *Central* FORCES.

CENTRAL-RULE, a rule diſcovered by Mr. Thomas Baker, whereby to find the center of a circle deſigned to cut the parabola in as many points as an equation to be conſtructed hath real roots. Its principal uſe is in the conſtruction of equations, and he has applied it with good ſucceſs as far as biquadratics.

The central-rule is chiefly founded on this property of the parabola, that if a line be inſcribed in that curve perpendicular to any diameter, a rectangle formed of the ſegments of the inſcript, is equal to the rectangle of the intercepted diameter and parameter of the axis.

The central rule has the advantage over Cartes and De Latere's methods of conſtructing equations, in that both theſe are ſubject to the trouble of preparing the equation, by taking away the ſecond term.

CENTRIFUGAL FORCE is that force by which all bodies that move round any other body in a curve, endeavour to fly off in every point of the curve.

The word is formed from the Latin, *centrum*, the center, and *fugio*, to fly.

CENTRIFUGAL MACHINE, a very curious machine, invented by Mr. Erſkine, for raiſing water by means of a centrifugal force, combined with the preſſure of the atmoſphere.

It conſiſts of a large tube of copper, &c. in the form of a croſs, which is placed perpendicular in the water, and reſts at the bottom on a pivot. At the upper part of the tube is a horizontal cog wheel, which touches the cogs of another in a vertical poſition; ſo that by the help of a double winch, the whole machine is moved round with very great velocity.

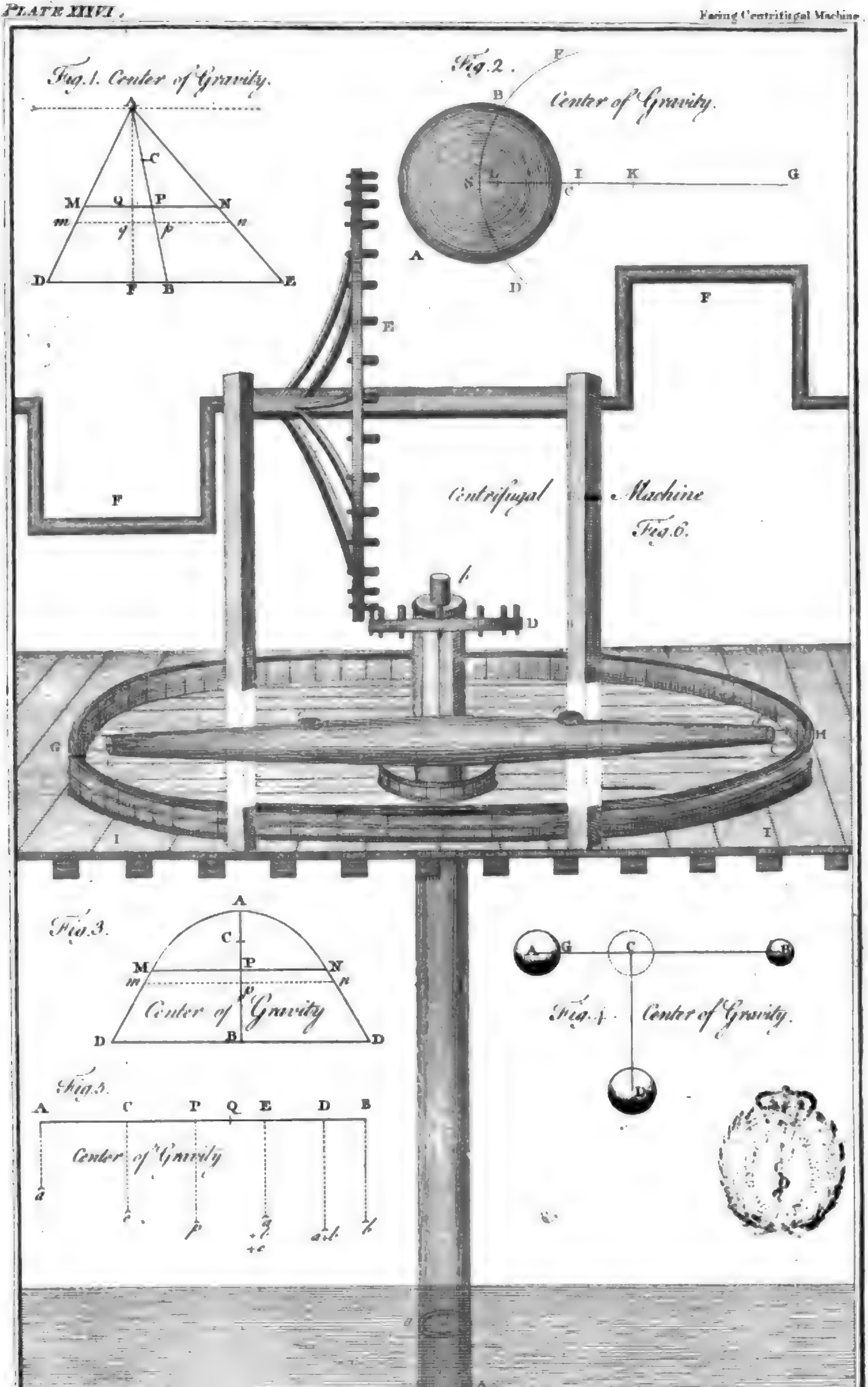


Fig. 1. Center of Gravity.
A
C
M
Q
P
N
m
q
p
n
D
F
B
E
Fig. 2.
Center of Gravity.
F
B
L
I
K
G
C
A
D
Centrifugal Machine
Fig. 6.
E
F
F
h
D
G
H
I
I
a
A
b
Fig. 3.
A
C
M
P
N
m
p
n
Center of Gravity
D
B
D
Fig. 4.
Center of Gravity.
A
G
C
B
D
Fig. 5.
A
C
P
Q
E
D
B
Center of Gravity
a
c
p
q
+e
d
b

PLATE XXXVII

Facing Centro Baryc.

Center of Gravity Fig. 1.

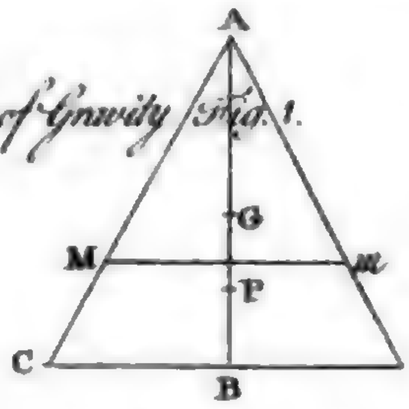
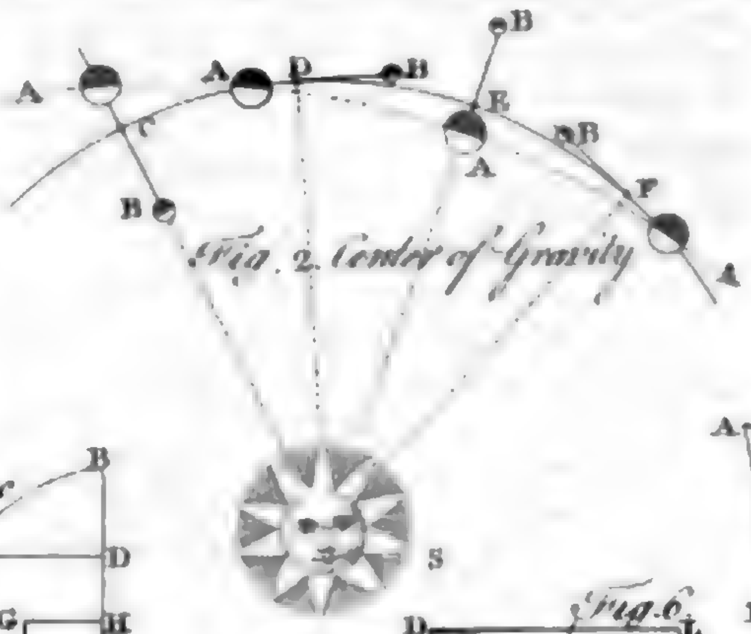
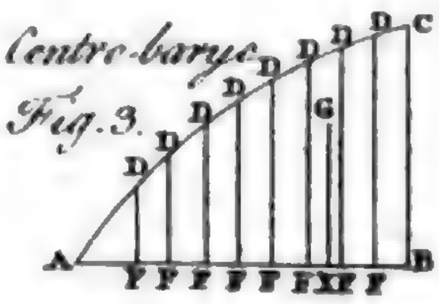


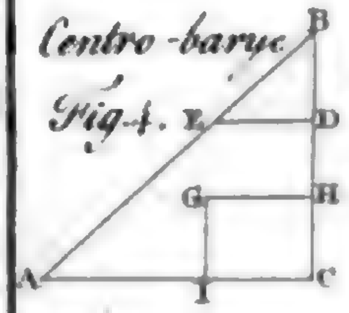
Fig. 2. Center of Gravity


A
B
C
A
D
B
E
B
A
B
F
A
S

Centro-baryc Fig. 3.


D
D
D
D
D
D
D
D
C
G
A
P P P P P P X P P
B

Centro-baryc Fig. 4.



Centro-baryc Fig. 5.

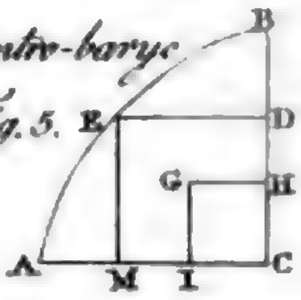


Fig. 7. Chain

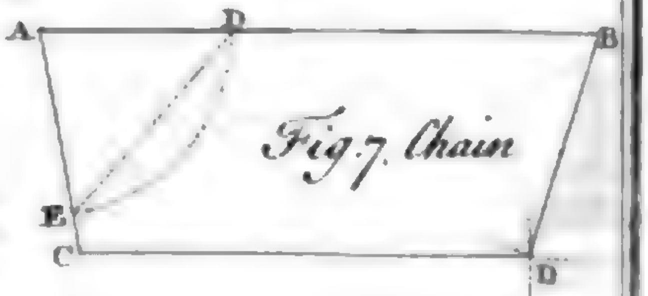
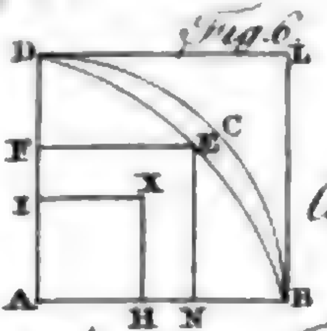


Fig. 6. Centro-baryc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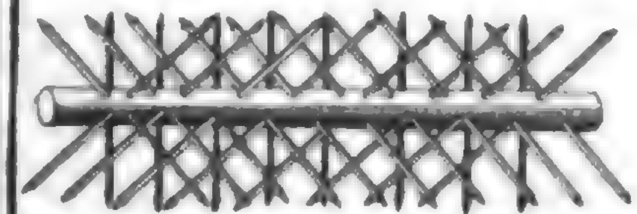

Fig. 7. Chevaux de Friese

Fig. 8. Chord

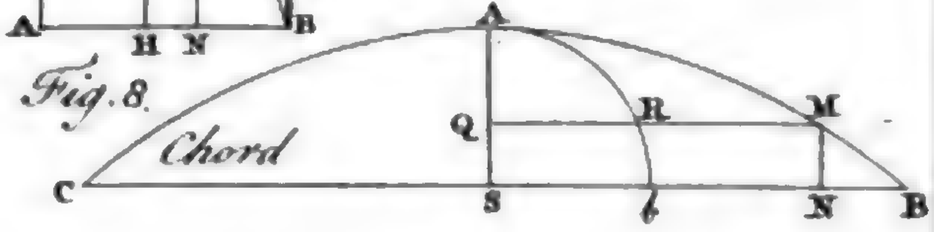

Fig. 9. Cissoid

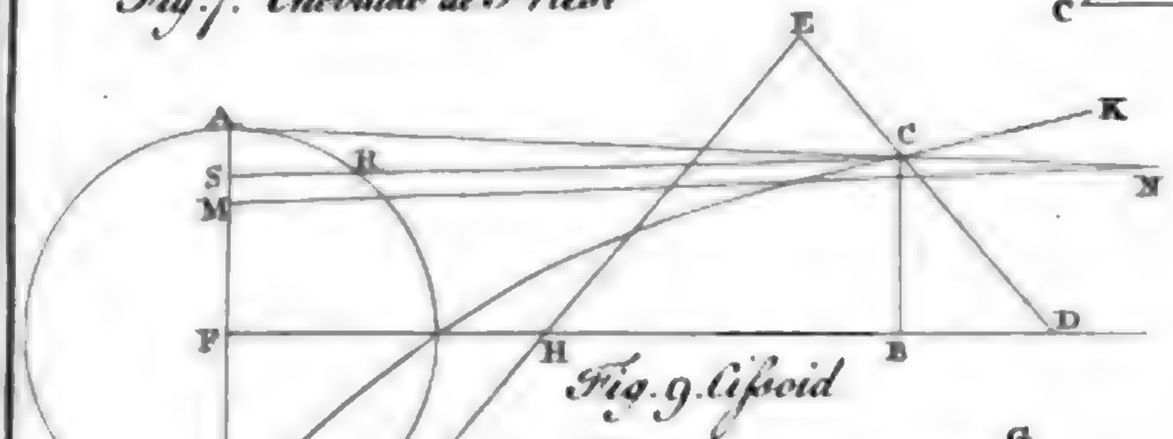
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Fig. 10. Circumferentor

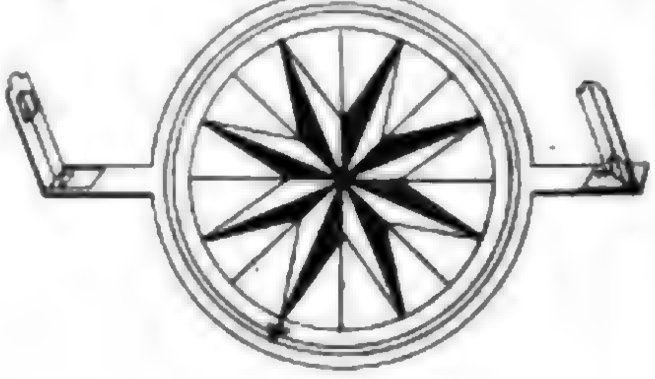
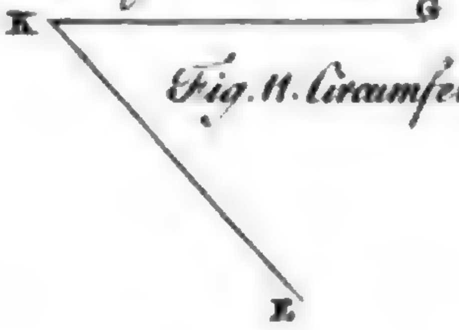


Fig. 11. Circumferentor



Compass

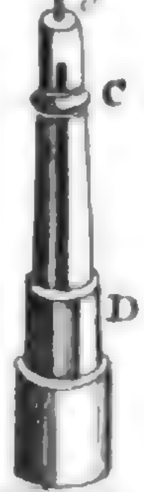


Fig. 12.

Fig. 13. Compass

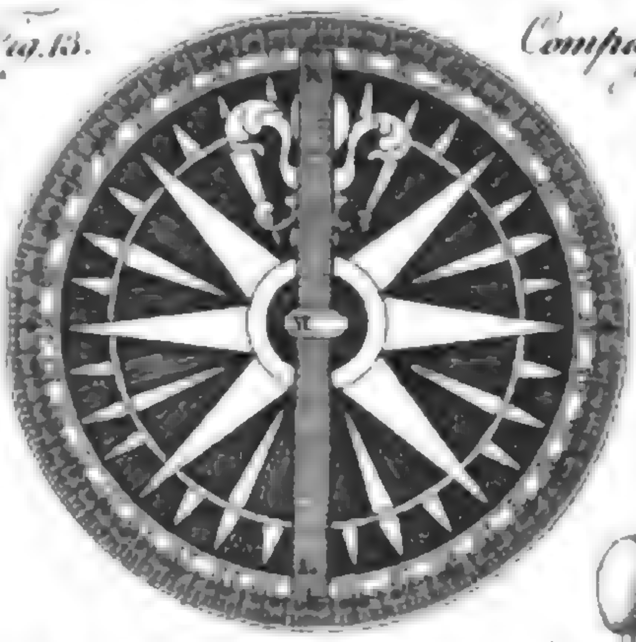


Fig. 14. Compass

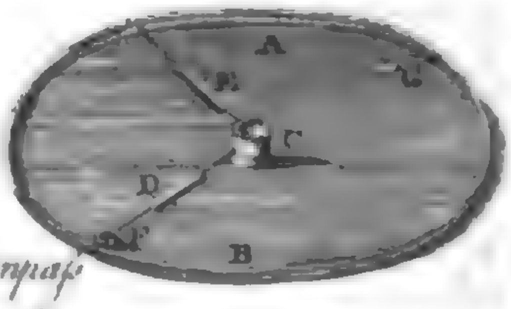


Fig. 16. Coining

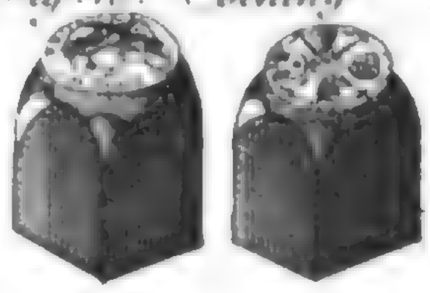


Fig. 15. Coining

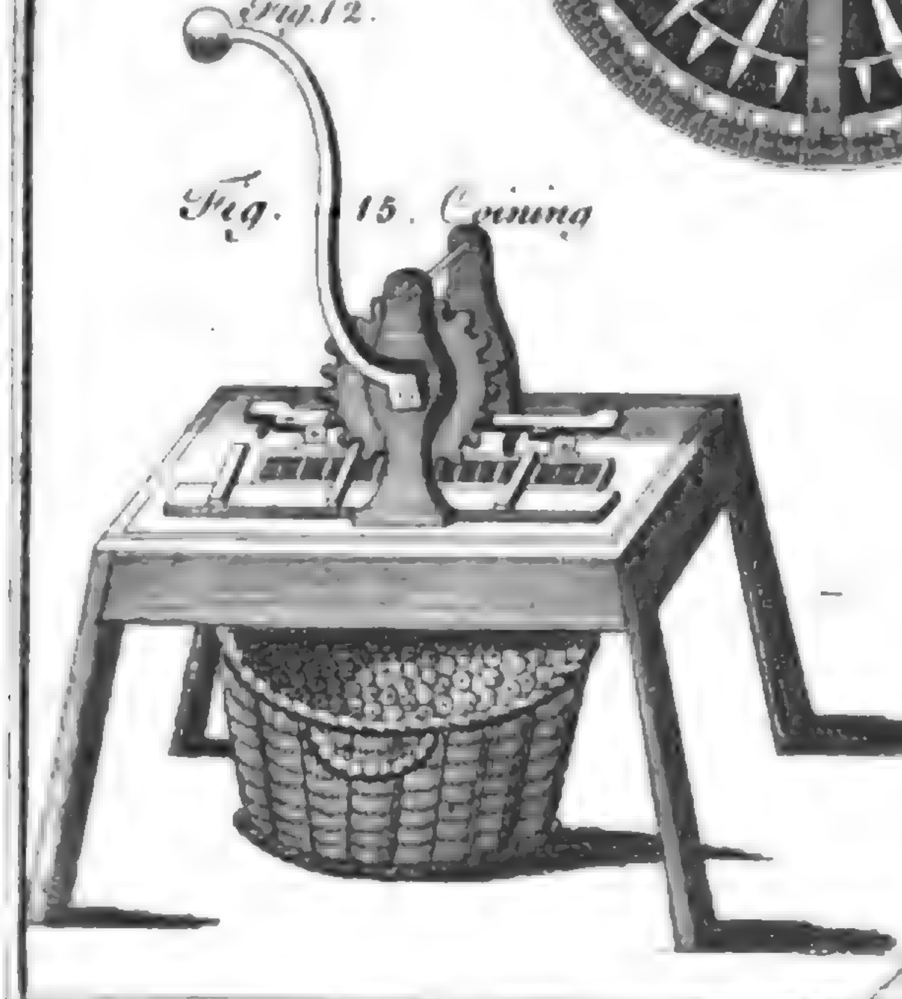
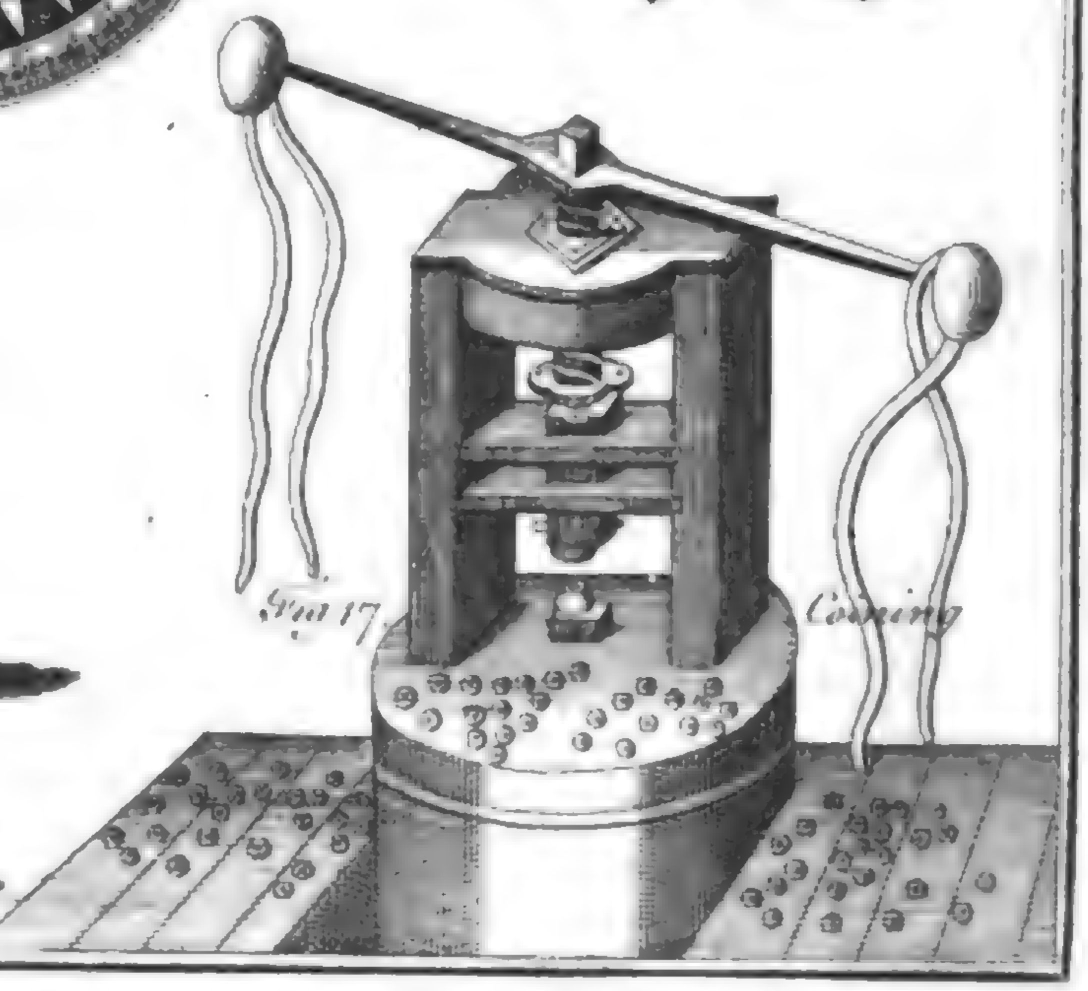


Fig. 17. Coining



Near the bottom of the perpendicular part of the tube is a valve opening upwards; and near the two extremities, but on contrary ſides of the arms, or croſs part of the tube, are two other valves opening outwards. Theſe two valves are, by the aſſiſtance of ſprings, kept ſhut till the machine is put in motion, when the centrifugal velocity of the water forces them open, and diſcharges itſelf into a ciſtern or reſervoir placed there for that purpoſe.

On the upper part of the arms are two holes, which are cloſed by pieces ſcrewing into the metal of the tube. Before the machine can work, theſe holes muſt be opened, and water poured in through them, till the whole tube be full: by this means all the air will be forced out of the machine, and the water ſupported in the tube by means of the valve at the bottom.

The tube being thus filled with water, and the holes cloſed by their ſcrew caps, it is turned round by means of the winch, whence the water in the arms of the tube acquires a centrifugal force, opens the valves near the extremities of the arms, and flies out with a velocity nearly equal to that of the extremities of the ſaid arms.

The above deſcription will be very eaſily underſtood by the figure we have added on plate XXXVI. *fig.* 6. which is a perſpective view of the centrifugal machine, erected on board a ſhip.

A B C is the copper tube.

D, a horizontal cog-wheel, furniſhed with twelve cogs.

E, a vertical cog-wheel, furniſhed with thirty-ſix cogs.

F, F, the double winch.

a, the valve near the bottom of the tube.

d, *b*, the two pivots on which the machine turns.

c, one of the valves in the croſs-piece; the other at *d*, cannot be ſeen in this figure, being on the other ſide of the tube.

e, *e*, the two holes through which the water is poured into the machine.

G H, the ciſtern, or reſervoir.

I, I, part of the ſhip's deck.

The diſtance between the two valves *c*, *d*, is ſix feet. The diameter of theſe valves is about three inches; and that of the perpendicular tube about ſeven inches.

If we ſuppoſe the men who work the machine can turn the winch round in three ſeconds, the machine will move round its axis in one ſecond; and conſequently each extremity of the arms will move with a velocity of 18. 8 feet in a ſecond. Therefore a column of water of three inches diameter will iſſue through each of the valves with a velocity of 18.8 feet in a ſecond: but the area of the aperture of each of the valves is 7.14 inches; which being multiplied by the velocity in inches = 225.6, gives 1610.784, cubic inches, the quantity of water diſcharged through one of the apertures in one ſecond; ſo that the whole quantity diſcharged in that ſpace of time through both the apertures is = 3221.568 inches; or 193294.08 cubic inches in one minute. But 60812 cubic inches make a tun, beer meaſure; conſequently, if we ſuppoſe the centrifugal machine revolves round its axis in one ſecond, it will raiſe nearly 3 tuns 44 gallons in one minute; but this velocity is certainly too great, at leaſt to be held for any conſiderable time; ſo that when this and other deficiencies in the machine are allowed for, two tuns in a minute is nearly the quantity that can be raiſed by it in one minute. And that this computation is near the truth appears from an experiment made on the 14th of May laſt, on board the Princeſs Mary at Woolwich, when the centrifugal machine was found to exceed the chain pump, at the rate of nineteen tuns and a half per hour; both being worked by an equal number of men. Now a good chain-pump will extract ſomething more than a ton and a half in a minute, or about forty-tons in an hour.

It will perhaps be unneceſſary to obſerve, that as the water is forced up the perpendicular tube by the preſſure of the atmoſphere, this machine cannot raiſe water above 32 feet high.

CENTRIPETAL FORCE is that by which a body is every way impelled, or any-how tends towards ſome point, as a center; among which may be reckoned gravity, whereby bodies tend towards the center of the earth; the magnetical attraction whereby it draws iron; and that force, whatever it be, whereby the planets are continually drawn back from right-lined motions, and made to move in curves.

The centripetal and centrifugal force of the ſame revolving body, in the ſame point of the curve that it deſcribes, are always equal and contrary. See CENTRAL FORCES.

The word is formed from the Latin, *centrum*, the center, and *peto*, to ſeek.

CENTRO-BARYC, in mechanics, is a method invented by P. Guldinus for determining the content of a ſuperficies, or ſolid, by means of the center of gravity, of which the following is a general inveſtigation.

Theorem I. Let G (pl. XXXVII. *fig.* 3.) be the center of gravity of the ſpace ABC, contained by the right-lines A B, B C, comprehending a right angle, and the curve-line ADC of any kind whatſoever: from G, draw GX parallel to BC. Now if we conceive the ſaid ſpace to be divided into an infinite number of equal parts, by the lines FD, FD, FD, &c. drawn parallel to BC; then will the ſum of the ſegments AFD, AFD, &c. be equal to the whole figure ABCDA, multiplied by XB.

Demonſtration.—Put n for the number of equal parts into which A B is divided, at the points FFF, &c. z the ſum of the ordinates FD, FD, FD, &c. or area of the whole ſpace, and let the parts AFD, FD, FD, &c. wherein the ſmall letters $a, b, c, d, e,$ &c. are placed, be repreſented by thoſe letters; then B X the diſtance of the center of gravity, from the point of ſuſpenſion B, will, by the principles of mechanics, be expreſſed by

$$\frac{na+\overline{n-1}\times b+\overline{n-2}\times c+\overline{n-3}\times d, \&c. - - - n}{z}, \text{ but}$$

$$a+b+c+d, \&c. - - - n = ABC$$
$$a+b+c+d, \&c. - - - n-1 = AFD$$
$$a+b+c+d, \&c. - - - n-2 = AFD$$

Whence the ſum of the infinite number of ſegments is equal to $na+\overline{n-1}\times b+\overline{n-2}\times c+\overline{n-3}\times d$, &c. continued until the number of terms is n, and is evidently equal to the above value of B X multiplied by Z. *Q. E. D.*

Theorem II. Things remaining as before, let the ſpace ABC be made to revolve about the ordinate BC as an axis, by which a ſolid will be formed, whoſe content will be equal to the area of the ſaid ſpace, multiplied by the circumference of that circle which the center of gravity G deſcribes during one entire revolution of ABC about the axis BC.

Demonſtration.—The ſolid formed by the circumvolution of A B C, about the axis B C, may be conſidered as made up of the upright ſurfaces of an infinite number of cylinders, whoſe perpendicular heights are the ordinates FD, FD, FD, &c. This being premiſed, let r for expreſs the ratio of the diameter to the circumference of a circle; then will the ſum of ſuch upright ſurfaces be equal to

$$2nar+\overline{n-1}\times 2rb+\overline{n-2}\times 2rc+\overline{n-3}\times 2rd, \&c. - - - n.$$

But B X, the diſtance of the center of gravity from the ordinate B C, is equal to

$$\frac{na+\overline{n-1}\times b+\overline{n-2}\times c, \&c. - - - n}{z};$$

which being multiplied by $2r$, gives the periphery of the circle deſcribed by the center of gravity; this again multiplied by z, the area of ABC, produces

$$\frac{2nar+\overline{n-1}\times 2br+\overline{n-2}\times 2rc+\overline{n-3}\times 2rd, \&c.}{z}\times z,$$

which is certainly equal to $2nar+\overline{n-1}\times 2br+\overline{n-2}\times 2rc+\overline{n-3}\times 2rd$, &c. the content of the ſolid formed by the revolution of ACB about the axis BC. *Q. E. D.*

From theſe theorems the following corollaries are deduced.

Corollary I. The area of the ſpace ABC, multiplied by G X the diſtance of the center of gravity from A B, is equal to the ſum of all the ſegments made by dividing ABC into an infinite number of equal parts, by right-lines drawn parallel to A B.

Corol. II. If the figure ABC revolves about the abſciſſa A B as an axis, the ſolid ſo formed will be equal to the area of the ſpace ABC, multiplied by the circumference of that circle, whoſe radius is G X, the diſtance of the center of gravity from A B.

Corol. III. By having the area, and place of the center of gravity, of any curved or right-lined ſpace given, we can cube the ſolid formed by the circumvolution of that figure about either the ordinate or abſciſſa.

Corol. IV. Having the magnitude of a ſolid, and the place of its center of gravity given, we can eaſily determine the area of the ſpace by the circumvolution of which the ſaid ſolid was produced.

We ſhall now proceed to give ſome examples of the uſe of the aforeſaid theorems.

Example I. Let A C B (pl. XXXVII. *fig*. 4.) be a given right-angled triangle; it is required to find the place G of its center of gravity.

From G draw G H and G I, parallel to A C and B C reſpectively. Put $BC = a$, $AC = b$, $BD = x$, D E (parallel to A C) $= y$; then, by ſimilar triangles, we have $\frac{bx}{a} = y$; whence $\frac{bxx}{2a}$ is the area of the triangle B D E; and, by theorem 1, $\frac{bxx\dot{x}}{2a}$ expreſſes the fluxion of the ſum of the ſegments, whoſe fluent, when $x = a$, becomes $\frac{baaa}{6a}$; let this be divided by $\frac{ba}{2}$, the area of A C B, the quotient, viz. $\frac{a}{3}$, is the required value of $CH = GI$. By the ſame way of reaſoning we get C I or $GH = \frac{b}{3}$.

Examp. II. Required the place of the center of gravity of the ſemi Apollonian-parabola A C B. (*fig*. 5.)

Imagine G to be the point ſought; draw G H and G I, parallel to A C and B C reſpectively. Put the axis $BC = a$, ordinate $CA = b$, abſciſs $BD = x$, ordinate $DE = y$, latus rectum $= p$; then by the nature of the curve $px = yy$, and thence the area of the indeterminate part E D B $= \frac{2}{3} \times p^{\frac{1}{2}} \times x^{\frac{3}{2}}$, which, being multiplied by $\dot{x}$, gives $\frac{2}{3} \times p^{\frac{1}{2}} \times x^{\frac{3}{2}} \times \dot{x}$, for the fluxion of the ſum of the ſegments, whoſe fluent (when $x = a$) being divided by the area of $ABC = \frac{2}{3} \times p^{\frac{1}{2}} \times a^{\frac{3}{2}}$, quotes $\frac{3}{5}a = GH$. Now in order to determine I C or G H, draw E M parallel to B C; put $AM = z$, $ME = u$, (the other parts as before; then $pu = 2bz - zz$, per property of the curve; whence $\frac{2bz\dot{z} - zz\dot{z}}{p}$ is the fluxion of the ſpace A M E, whoſe fluent $\frac{bz^2}{p} - \frac{z^3}{3p}$, being multiplied by $\dot{z}$, becomes (by theo. 2.) the fluxion of the ſum of the ſegments, the fluent of which (when $z = b$) being divided by $\frac{2}{3}ab$, gives the value of I C or $GH = \frac{3}{8}b$.

Examp. III. Let it be required to cube the cone formed by the revolution of the right-angled triangle A C B (*fig*. 4.) about the ſide C B as an axis.

By theorem 2. the area of the triangle A C B, multiplied by the periphery of the circle, whoſe radius is G H, is equal to the ſolidity of the generated cone. Put $p = 1{\cdot}31459$, then $\frac{2p \times GH \times AC \times BC}{2}$, $=$ the ſolidity, but the ſame letters remaining as in Ex. I. $GH = \frac{b}{3}$; whence $\frac{2pbba}{6}$, or $\frac{,7854 \times bba}{3}$, is the cubation required.

Examp. IV. To cube a conoid, generated by the rotation of the common parabola about its abſciſs, conſidered as an axis.

Let the ſemi-parabola A C B (*fig*. 6.) repreſent the generating ſpace, B C the axis of rotation; then, things remaining as in the ſecond example, we ſhall have G H $= \frac{3}{8}b$; whence (by theo. 2.) $\frac{2}{3}ab \times \frac{6b}{8} \times 3{\cdot}14159 =$ the ſolidity of the generated conoid; and which is alſo equal to $\frac{4abb \times {\cdot}7854}{2}$, half the conoid's circumſcribing cylinder.

Examp. V. Let it be required to find the place of the center of gravity of a ſemi-circle.

If a quadrant of a circle be ſuppoſed to revolve about either radius as an axis, the ſolid ſo generated will be a hemiſphere, and its content (putting r for the radius, $3{\cdot}14159 = p$) equal to $\frac{2}{3} \times prrr$, which being divided by the area of the quadrant multiplied by $2p$, gives $\frac{4r}{3p}$ for the diſtance of the center of gravity of the ſemi-circle, from the center of the whole circle, by theo. 2. and, as it is obvious that the center of gravity of a ſemi-circle muſt be ſomewhere in that radius which is perpendicular to the diameter thereof, it follows that $r - \frac{4r}{3p}$, or r multiplied by the conſtant factor ,5756 is the verſed ſine of the arch ſubtending the chord-line paſſing through the center of gravity of a ſemi-circle.

Examp. VI. Let A B C D (*fig*. 6.) be a quadrant of a circle, and D E B a curve-line of ſuch ſort, that if from any point therein, as E, E F, be drawn perpendicular, and E N parallel to A D, then A D ſhall be to B C D as D F to D C; it is required to find the place of X, the center of gravity of the ſpace A D E B, uſually called the quadratrix of Mr. Tſchirnhaus.

From the point X, draw X I and X H parallel to A B and A D reſpectively. Put $AD = r$, $BCD = b$, $DC = z$, $FE = y$, $\frac{r}{b} = d$, then $\frac{rz}{b} = DF = dz$, by the above-mentioned property of the curve, and therefore $dy\dot{z}$ is the fluxion of the ſpace D E F. By the property of the circle, the fluxion of the arch D C is equal to $\frac{r\dot{y}}{\sqrt{r^2 - y^2}}$, whence $\frac{dry\dot{y}}{\sqrt{r^2 - y^2}} = dy\dot{z}$; and conſequently $-dr\sqrt{rr - yy}$, is equal to the fluent of $dy\dot{z}$: but to find the neceſſary correction, let $y = 0$; then, as in this circumſtance, the fluent of $dy\dot{z}$ evidently vaniſhes, we ſhall have $-drr = 0$; whence $drr - dr\sqrt{r^2 - y^2}$ is the correct fluent of $dy\dot{z}$, equal to the area of the ſpace DEF, which, being multiplied by $d\dot{z}$, gives $ddrr\dot{z} - ddr\dot{z}\sqrt{r^2 - yy}$, whoſe fluent, viz. $ddrrz - ddrryy$ or $ddrrb - ddr^3$ (when $y = r$ and $z = b$) is the ſum of the ſegments by theo. 1. Let this expreſſion be divided by the area of $ADEBA = drr$, and the quotient $r - \frac{rr}{b}$ gives the value of X H; and therefore $DI = \frac{rr}{b}$. Hence it appears, that if A D be divided in I, ſo that D I : A D : : A D : B C D, and from the point I a line drawn parallel to AB, the center of gravity of the ſpace A D E B A will be at ſome point in the ſaid line. Our next buſineſs is to determine the point X in the indefinite right-line I X, that ſhall be the center of gravity of the propoſed ſpace. By theo. 2. it appears, that if the ſpace A D E B A be made to revolve about the radius A D as an axis, the ſolid ſo formed will be equal to the area of the ſaid ſpace multiplied by the periphery of that circle whoſe radius is the right-line I X. Let the ſame letters remain as before, and put $,7854 = s$; then $4sy^2 \times \frac{dr\dot{y}}{\sqrt{r^2 - y^2}}$ will be the fluxion of the indefinite ſolid made by the circumvolution of DEF about D F, whoſe fluent, when $y = r$, will be the content of the whole ſolid formed by the rotation about the axis AD. Now, in order to obtain the fluent of $4sy^2 \times \frac{dr\dot{y}}{\sqrt{r^2 - y^2}}$, put $4drs = a$, and $2rx - xx = yy$; then $y = \sqrt{2rx - xx}$, $\dot{y} = \frac{r\dot{x} - x\dot{x}}{\sqrt{2rx - xx}}$; and becauſe $2rx - xx = yy$, we ſhall have $rr - 2rx + xx = rr - yy$; whence $r - x = \sqrt{r^2 - y^2}$, and $\dot{y} = \frac{r - x}{\sqrt{2rx - x^2}} \times \dot{x}$; ſubſtitute theſe values of y and $\dot{y}$ in the fluxion of the ſolid, and it will become $a \times \sqrt{2rx + x^2} \times \dot{x}$, the fluent of this expreſſion is evidently the area of a part of a circle whoſe verſed ſine is x, right ſine $\sqrt{2rx - xx}$ to the radius r, multiplied by the conſtant quantity a; therefore, when $x = r$, the ſaid fluent becomes a into the area of a quadrant of a circle, whoſe radius is r; that is, the content of the ſolid formed by the rotation of the ſpace ADEBA about the axis AD, will be expreſſed by $2r^3s$; but the ſolidity of the circumſcribing cylinder is $4r^3s$: therefore it appears, that, when ABCDA is a quadrant, the ſolid produced by the circumvolution of the figure ABEDA about the axis AD, is to the circumſcribing cylinder, as 1 to 2; which ſolid is alſo, by theo. 2. equal to the product of the area of the ſpace ABEDA, by the periphery of that circle, whoſe radius is the right-line XI, from whence XI is determined, and is equal to $\frac{b}{4}$. It has been ſhewn above, that the center of gravity muſt be ſomewhere in the right-line XI; and we have now found that AH or XI muſt be equal to one fourth of the arch BCD; therefore the place of the center of gravity in Mr. Tſchirnhaus's quadratrix is truly determined.

Corollary.—Hence the ſolid formed by the circumvolution of the ſpace ADEBA, about the other radius AB as an axis, may be eaſily cubed. For, by the ſecond theorem, it is evident that the ſaid ſolid is equal to the area of the ſpace ADEBA, multiplied by the periphery of the circle, whoſe radius is AI or HX.

But to ſhew how preferable this method for obtaining the center of gravity of a given ſpace, is to the uſual way of taking the ſum of the momentums, we need only obſerve, that, to determine the point I (D being the point of ſuſpenſion), the fluent of $d^2yz\dot{z}$ muſt be found; and to find the point H (B being the point of ſuſpenſion), that of $\overline{r-y}\times\overline{dz-r}\times\dot{y}$ muſt be inveſtigated. But as the fluents of theſe fluxional expreſſions are not very eaſily obtained by the common forms, it may be neceſſary to ſhew the method of finding the fluent of the general expreſſion $z^n x^p y^m \dot{y}$, wherein z is the length of an arch of a circle, whoſe radius is r, y the ſine, and x the co-ſine of that arch.

Put $Az^n+Bz^{n-1}+Cz^{n-2}+Dz^{n-3}$, &c. for the fluent of $z^n x^p y^m \dot{y}$; whence we have,

$$\left.\begin{array}{l}\dot{A}z^n+\dot{B}z^{n-1}+\dot{C}z^{n-2}+\dot{D}z^{n-3}, \text{\&c.}\\ -z^n x^p y^m \dot{y}+nAz^{n-1}\dot{z}+\overline{n-1}\,Bz^{n-2}\dot{z}, \text{\&c.}\end{array}\right\}=0.$$

And by comparing the homologous terms, we have $\dot{A}=x^p y^m \dot{y}$, $\dot{B}=-nA\dot{z}$, $\dot{C}=-\overline{n-1}\,B\dot{z}$, $\dot{D}=-\overline{n-2}\,C\dot{z}$, $\dot{E}=-\overline{n-3}\,D\dot{z}$, &c. but by the nature of the circle $\dot{z}=\frac{r\dot{y}}{x}$, whence $\dot{B}=\frac{rnA\dot{y}}{-x}$, $\dot{C}=\frac{\overline{n-1}.r.B\dot{y}}{-x}$, $\dot{D}=\frac{\overline{n-2}.rC\dot{y}}{-x}$, &c. therefore if the fluent of $x^p y^m \dot{y}$ be denoted by Q, that of $\frac{Q\dot{y}}{x}$ by R, that of $\frac{R\dot{y}}{x}$ by S, that of $\frac{S\dot{y}}{x}$ by T, &c. &c: then the fluent of $z^n x^p y^m \dot{y}$ will be expreſſed by $Qz^n-nrRz^{n-1}+n.\overline{n-1}.r^2.Sz^{n-2}-n.\overline{n-1}.\overline{n-2}.r^3Tz^{n-3}$, &c. and ſince $\dot{y}=\frac{x\dot{x}}{y}=\frac{x\dot{z}}{r}$ by the property of the circle, it follows that $z^n x^p y^m \dot{y}=-z^n x^{p+1}y^{m-1}\dot{x}=\frac{z^n x^{p+1}y^m\dot{z}}{r}$.

The content of the ſolid formed by the rotation of the ſpace ABEDA, about the axis AB, is equal to the area of the ſaid ſpace multiplied by the periphery of the circle deſcribed with the radius AI, as appears by theo. 2. both which have already been determined, the former being drr, and the latter $r-\frac{rr}{b}$, into 2×3.14159; therefore $\overline{dr^3-\frac{dr^4}{b}}\times6.28318$, is the content required.

But to ſhew, by way of illuſtrating the above general inveſtigation, how the ſame thing may be otherwiſe obtained, put $.7853=s$; then if we draw EN parallel to AD, it is evident that $NE^2\times4s\times$ fluxion of NB, or its equal $4s\times\overline{r-dz}^2\times-\dot{y}$, will be the fluxion of the ſolid formed by the circumvolution of the indefinite ſpace NBEN about the axis AB, equal to $-rr\dot{y}+2dz\dot{y}-d^2z^2\dot{y}$ into $4s$. To find the fluent of this expreſſion, for n, r, and m, in the general form, write 1, 0, and 0 reſpectively; whence $x^p y^m \dot{y}$ becomes $\dot{y}$, and therefore $Q=y$, $\frac{Q\dot{y}}{x}$, or $\dot{R}=\frac{y\dot{y}}{x}=\frac{y\dot{y}}{\sqrt{r^2-y^2}}\therefore R=-\sqrt{r^2-y^2}$, conſequently the fluent of $z\dot{y}$ is $yz+r\sqrt{r^2-y^2}$. Again, if we take $n=2$, p and $m=0$, we ſhall have Q and R as before, $\dot{S}=-\frac{\dot{y}\sqrt{r^2-y^2}}{x}=-\dot{y}\therefore S=-y$; ſo that the fluent of $z^2\dot{y}$, is $yz^2+2rz\sqrt{r^2-y^2}-2r^2y$; and hence the fluent of $-rr\dot{y}+2dz\dot{y}-d^2z^2\dot{y}$, becomes $-rry+2dr\times\overline{yz+r\sqrt{r^2-y^2}}-d^2\times\overline{yz^2+2rz\sqrt{r^2-y^2}-2r^2y}$; this expreſſion, when $y=r$, ſhould entirely vaniſh; but there is then left $\frac{2r^5}{bb}$, which is therefore the neceſſary correction of the fluent. Let now $y=0$, and we ſhall have $2dr^3$, from which ſubtract $\frac{2r^5}{bb}$, the remainder, viz. $2dr^3-\frac{2dr^4}{b}$, being multiplied into $4s$, becomes the content of the ſolid made by the revolution of the ſpace ABEDA about the axis AB, the very ſame as before.

CENTRONIA, in zoology, the name by which Dr. Hill calls the *echinus marinus*, or ſea-hedge-hog, or ſea-egg; which he defines to be an animal living under the defence of a ſhelly covering, formed of one piece, and furniſhed with a vaſt number of ſpines, moveable at the animal's pleaſure.

Theſe animals conſtitute a diſtinct genus by themſelves, the ſpecies of which are very numerous, and ſome of them extremely elegant. 1. The centronia with variolated papillæ. 2. The common round centronia, with ſmall papillæ. 3. The ſea-apple. 4. The high-backed cordated centronia, called ſpatangus, or ſpatagoides, by authors. 5. The round flat centronia, called placenta: with a great many other ſpecies. See plate XXXV. *fig.* 8. where N°. 1. repreſents the variolated centronia; and N°. 2. the common centronia.

CENTRUM, in geometry and mechanics, the ſame with center. See the article CENTER.

CENTRUM PHONICUM, in acouſtics, the place where the ſpeaker ſtands, in polyſyllabic and articulate echoes.

CENTRUM PHONO-CAMPTICUM, the object or place that returns the voice in an echo. See the article ECHO.

Blancanus ſays, that no ſyllable can be diſtinctly and clearly returned, under the diſtance of twenty-four geometrical paces.

CENTRUM TENDINOSUM, in anatomy, a point wherein the tendons of the muſcles of the diaphragm meet.

This center is perforated towards the right ſide, for the vena cava; and the deſcending trunk of the great artery, the thoracic duct, and azygos vena, paſs between its two inferior proceſſes.

CENTRY-BOX, the ſame with the guerritte, only the former is of wood, and the other of ſtone. It is a wooden cell, or lodge, to ſhelter the centinel, or centry, from the injuries of the weather.

In fortification, they are uſually placed on the flanked angles of the baſtions, on thoſe of the ſhoulder, and ſometimes in the middle of the curtain.

CENTURION, among the Romans, an officer in the infantry, who commanded a century, or an hundred men.

The centurions held the firſt rank in the firſt cohort of a legion, and two of them the place of the two firſt haſtati, or pikemen: the firſt among the principes was alſo a centurion.

The centurion primipilus was the chief of the centurions: he was not under the command of any tribune, as all the reſt were; he had four centuries under his direction, and guarded the ſtandard and the eagle of the legion.

CENTURY, in a general ſenſe, any thing divided into or conſiſting of an hundred parts.

The Roman people, when they were aſſembled for the electing of magiſtrates, enacting of laws, or deliberating upon any public affair, were always divided into centuries; and voted by centuries, in order that their ſuffrages might be the more eaſily collected; whence theſe aſſemblies are called comitia centuriata. The Roman cohorts were alſo divided into centuries. See the articles CENTURION and COHORT.

CENTURY, in chronology, the ſpace of one hundred years.

CENTURIES *of Magdeburg*, a famous eccleſiaſtical hiſtory, ranged into thirteen centuries, carried down to the year 1298, compiled by ſeveral hundred proteſtants of Magdeburg, the chief of whom was Matthias Flaccius Illyricus.

CENTUSSIS, in Roman antiquity, a coin containing an hundred aſſes.

CEPA, the onion. See ONION.

CEPHALALGIA, from κεφαλη, the head, and αλγη, pain, in phyſic, the head-ach. See the article HEAD-ACH.

CEPHALIC, in a general meaning, ſignifies any thing belonging to the head, or its parts.

CEPHALIC MEDICINES, are remedies for diſorders of the head.

Under this denomination are comprehended all thoſe medicines which have a particular relation to the brain; ſo that cephalic remedies, in general, are ſuch as promote the ſecretion and diſtribution of the ſpirits, and are commonly of a volatile, ſpirituous, and aromatic nature.

CEPHALIC VEIN, in anatomy, creeps along the arm between the ſkin and the muſcles, and divides it into two branches; the external goes down to the wriſt, where it joins the baſilica, and turns up to the back of the hand: the internal branch, together with a ſmall one of the baſilica, makes the mediana.

The ancients uſed to open this vein for diſorders of the head, for which reaſon it bears this name; but a better acquaintance with the circulation of the blood informs us, that there is no foundation for ſuch a notion.

CEPHALOPHARYNGÆI, in anatomy, the firſt pair of muſcles of the upper-part of the gullet, which proceed from beſide the head and neck, and are ſpread more largely upon the tunic of the gullet.

Theſe muſcles ariſe from that part where the head is joined to the firſt vertebra of the neck, from whence, marching downwards, they ſpread about the pharnyx, with a large plexus of fibres, and ſeem to make its membrane: this ſtreightens the throat in ſwallowing.

CEPHEUS, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars, in Ptolemy's catalogue, are thirteen; in Tycho's, eleven; in Hevelius's, forty; and in Mr. Flamſtead's, thirty-five.

CEPI CORPUS, in law, a return made by the ſheriff, that upon a capias, or other like proceſs, he has taken the defendant's body.

CEPRONITES, a name uſed by the ancients for a kind of jaſper.

CEPITES, a ſtone of the mocoa kind, otherwiſe called dendrites. See DENDRITES.

CERASTES, the horned ſnake, in zoology, is the name of a ſpecies of ſerpent, with two protuberances on its forehead, hard as a ſhell, and from which it has its name.

CERASTUS, the cherry-tree, in botany, the name of a well-known genus of trees, the flower of which is roſaceous, or compoſed of ſeveral petals arranged in a circular form: the piſtil ariſes from the cup, and finally becomes a roundiſh, or heart-faſhioned fleſhy fruit, containing a ſtone of the ſame ſhape with its kernel.

The ſeveral ſorts of cherry-trees are propagated by budding or grafting the ſeveral kinds into ſtocks of the black or wild red cherries, which are ſtrong ſhooters, and of a longer duration than any of the garden kinds. The ſtones of theſe two ſorts are ſown in a bed of light ſandy earth in autumn, and the young ſtocks produced from them are to remain where they are ſown till the ſecond autumn; when in October they ſhould be planted out into a rich earth, at three feet diſtant from row to row, and at about ten inches diſtant in the rows. The ſecond year after the planting out, they will be fit to bud, if they are intended for dwarfs; but if they are deſigned for ſtandards, they will not be tall enough till the fourth year; for they ſhould be budded or grafted ſix feet from the ground.

The grafting is uſually performed in ſummer, and the head of the ſtock is to be cut off in the beginning of March following, about ſix inches above the bud; and if the bud has ſhot well, and there be any fear of its being diſplaced by the winds, it muſt be gently tied up to the part of the ſtock left above it. The following autumn theſe trees will be fit to be removed and ſet where they are to remain, or they may be left two years. Many, when they plant theſe trees in their places, lop off a great part of their heads; but this is an injury that often kills them; and when they eſcape, they ſeldom get well over it in leſs than four or five years. If the trees are intended for walls, it is adviſeable to plant dwarfs between the ſtandards, that theſe may cover the lower part of the wall, while the others ſpread over the upper part; and when the dwarfs riſe to fill the whole walls, the ſtandards ſhould be taken entirely away. When theſe trees are removed from the nurſery, the dead fibres of the roots muſt be carefully taken off, and the upper-part of the ſtock, which is above the bud, muſt be cut off cloſe down to the back-part of it: the bud muſt be placed directly from the wall.

Cherry-trees thrive beſt in a dry hazly loam: in a gravelly ſoil they are very ſubject to blights, and ſeldom ſtand long good. They ſhould be placed at fourteen feet aſunder, with a ſtandard tree between each two.

In pruning theſe trees their ſhoots ſhould never be ſhortened, for they moſtly produce their fruit from their extreme parts. All the fore-right ſhoots are to be diſplaced, and the others trained horizontally; and where there is a vacancy in the wall, the branches being ſhortened, will throw up a ſhoot or two to fill it. *Miller's Gard. Dict.*

CERATE, in pharmacy, the name of one of the ſorts of topical medicines, ſofter than a plaſter, and harder than an ointment.

The word is formed from the Latin, *ceratum*, wax, becauſe wax is a principal ingredient in all compoſitions of this kind.

CERATOGLOSSUM, in anatomy, the name of a pair of muſcles, ſerving to draw the tongue directly into the mouth; but if only one of them acts, it draws the tongue to one ſide of the mouth.

CERBERUS, the name of a dog, with three heads, whom the poets made to be the porter of the infernal regions.

The mythologiſts underſtand by Cerberus the earth. They derive his name from Κρεοβορος, *carnivorus*, it being the property of the earth to devour bodies. The Platoniſts underſtand by him the bad dæmon, who, as Porphyry expreſſes it, is found in three elements, air, water, and earth; whence he is deſcribed as having three heads.

CERBERUS, among chemiſts, a term uſed by ſome to denote mercury.

Helmont likewiſe uſes the phraſe *cerberus chemicus*, to denote common nitre, or ſalt-petre.

CERDONIANS, in church hiſtory, ancient heretics, who maintained moſt of the errors of Simon Magus, Saturnel, and other Gnoſtics.

They aſſerted two principles, the one good, and the other evil: this laſt, according to them, was creator of the world, and the God that appeared under the old law: the firſt, whom they called unknown, was the father of Jeſus Chriſt, who, they taught, was only incarnate in appearance, and was not born of a virgin, nor ſuffered death, but in appearance.

CEREALIA, in antiquity, the ſacred rites of the goddeſs Ceres, inſtituted by Triptolemus. They were performed in ſo ſtrictly religious a manner, that it was thought ſufficient to pollute them, if any one at that time ſhould lie with his wife. They made uſe of no wine in the ſacrifices of Ceres; whence Plautus ſays, that Megadorus had made a marriage-ſupper for Ceres, becauſe he had provided no wine for the gueſts.

The ſolemnity of the cerealia paſſed from the Greeks to the Romans. After the ſecond Punic war, they celebrated the feſtival with more pomp; for they carried in proceſſion a great many ſtatues and paintings of chariots, crowns, and the rich plunder taken from the enemy. Macrobius tells us an egg made part of the ſhow, as being an emblem of Ceres. Memmius, when Curule Ædile, was the firſt who celebrated this feſtival, as appears from a medal of Ceres, with this inſcription, *Memmius Ædilis cerealia primus fecit.* See Ceres.

CEREBELLUM, in anatomy, the hinder part of the brain. See the article Brain.

CEREBRUM, in anatomy, denotes the brain. See the article Brain.

CEREMONIAL, in a general ſenſe, ſomething belonging to or partaking of the nature of ceremonies: thus we ſay, the ceremonial law, the ceremonial of princes, &c.

CEREMONY, *Ceremonia*, an aſſemblage of ſeveral actions, forms, and circumſtances, ſerving to render a thing more magnificent and ſolemn; particularly uſed to denote the external rites of religious worſhip, the formalities of introducing ambaſſadors to audiences, &c.

Maſter of the Ceremonies, an officer inſtituted by king James I. for the honourable reception of ambaſſadors and ſtrangers of quality: he wears about his neck a chain of gold, with a medal under the crown of Great-Britain, having on one ſide an emblem of Peace, with this motto, Beati Pacifici; and on the other, an emblem of war, with Dieu et Mon Droit. His ſalary is three hundred pounds per annum.

Aſſiſtant Maſter of the Ceremonies is to execute the employment in all points whenſoever the maſter of the ceremonies is abſent. His ſalary is one hundred and forty pounds thirteen ſhillings and four-pence per annum.

Marſhal of the Ceremonies is their officer, being ſubordinate to them both. His ſalary is one hundred pounds per annum.

CERES, a Pagan deity, the inventor, or goddeſs, of corn; in like manner as Bacchus was of wine.

She was the daughter of Saturn and Ops, and the mother of Proſerpine, whom ſhe had by Jupiter. Pluto having ſtolen away Proſerpine, Ceres travelled all over the world in queſt of her daughter, by the help of a torch, which ſhe had lighted in Mount Ætna.

As Ceres was thus travelling in ſearch of her daughter, ſhe came to Celeus, king of Eleuſis, and undertook to bring up his infant ſon Triptolemus. Being deſirous to render her charge immortal, ſhe fed him in the day-time with divine milk, and in the night covered him with fire. Celeus obſerving an unuſual improvement in his ſon, reſolved to watch his nurſe, to which end he hid himſelf in that part of the houſe where ſhe uſed to cover the child with fire; but when he ſaw her put the infant under the embers, he cried out, and diſcovered himſelf. Ceres puniſhed the curioſity and indiſcretion of the father with death. Afterwards ſhe taught the youth the art of ſowing corn and other fruits, and mounted him in a chariot, drawn by winged dragons, that he might traverſe the world, and teach mankind the uſe of corn and fruits. After this, having diſcovered, by means of the nymph Arethuſa, that Proſerpine was in the infernal regions, ſhe applied to Jupiter, and obtained of him that Proſerpine ſhould be reſtored, on condition that ſhe had taſted nothing during her ſtay in that place: but it being diſcovered, by the information of Aſcalaphus, that, as ſhe was walking in Pluto's orchard, ſhe had gathered an apple, and had taſted of ſome of the ſeeds, ſhe was for ever forbidden to return. Ceres, out of revenge, turned Aſcalaphus into an owl. At length, Jupiter, to mitigate her grief, permitted that Proſerpine ſhould paſs one half of the year in the infernal regions with Pluto, and the other half with her mother on earth.

The poets ſometimes take Ceres for the Moon, as they do Bacchus for the Sun.

Cicero ſpeaks of a temple of Ceres at Catanea in Sicily, where was a very ancient ſtatue of that goddeſs, but entirely concealed from the ſight of men, every thing being performed by matrons and virgins.

CERINTHE, honey-wort, in botany, a genus of plants, the flower of which conſiſts of a ſingle petal; the tube is ſhort and thick, the limb is thicker than the tube, and ſomewhat bellied: it is divided into five ſegments, and the mouth is open and pervious: the fruit conſiſts of two hard oſſeous bodies of an oval figure, gibbous on the outſide, plane within, acute, emarginated, and containing two cells: the ſeeds are ſingle, roundiſh, and accuminated.

CERINTHIANS, chriſtian heretics, followers of Cerinthus, who lived, and publiſhed his hereſy, in the time of the apoſtles themſelves; for Epiphanius places him in the year of Chriſt 80, in the reign of Domitian. He had been circumciſed, and was probably of Jewiſh extraction. He continued a long time in Egypt, where he acquired the ſciences and philoſophy: He afterwards went into Aſia, where he formed a ſect, to which he gave his own name.

St. Epiphanius pretends, that long before the eſtabliſhment of his ſect, he had occaſioned great troubles in Jeruſalem. It was Cerinthus, according to that author, who ſtirred up the Jewiſh converts to oppoſe the preaching of the goſpel among the Gentiles. He adds, that the Chriſtians who preached at Antioch the neceſſity of circumciſion, were followers of Cerinthus; who had ſent them there for that very purpoſe: that they were the Cerinthians who obliged St. Paul to circumciſe Titus; and that apoſtle deſcribes theſe men under the character of falſe apoſtles, deceitful workers, who transform themſelves into the apoſtles of Jeſus Chriſt. St. Jerom ſays he was anathematized, and driven out of the church by the apoſtles, becauſe he joined the ceremonies of the law with the precepts of the goſpel.

The particulars in which the hereſy of the Cerinthians conſiſted were theſe: They did not allow that God was the author of the creatures, but ſaid, that the world was created by an inferior power: They attributed to this creator an only ſon, but born in time, and different from the word. They admitted ſeveral angels and inferior powers, as ſilence, depth, fulneſs: in which they were afterwards followed by the Valentinians. They maintained that the law and the prophets came not from God, but from the angels; and that the God of the Jews was only an angel.

As to our Saviour, the Cerinthians diſtinguiſhed between Jeſus and Chriſt: they ſaid that Jeſus was a mere man, born like other men, of Joſeph and Mary; but that he excelled all others in juſtice, prudence, and wiſdom: that Jeſus being baptized, the Chriſt of the ſupreme God, that is, the holy ſpirit, deſcended upon him; and that, by the aſſiſtance of this Chriſt, Jeſus performed his miracles: that Jeſus ſuffered, and roſe again, but that the Chriſt had before left him, and returned to heaven.

It was partly to refute the hereſy of Cerinthus, that St. John wrote his goſpel; notwithſtanding which ſome heretics pretended that this very goſpel was written by Cerinthus himſelf: however, the Cerinthians admitted no goſpel but that of St. Matthew. They likewiſe rejected the Acts of the apoſtles, and the epiſtles of St. Paul, becauſe he was an enemy to the law.

CERTIFICANDO de Recognitione Stapulæ, a writ iſſued to the mayor of the ſtaple, commanding him to certify to the lord-chancellor a ſtatute-ſtaple taken before him, where the party refuſes to bring it.

CERTIFICATE, in law, a writing made in any court, to give notice to another court of any thing done therein. The clerks of the crown, aſſize, and the peace, are to make certificates into the King's Bench, of the tenor of all indictments, convictions, outlawries, &c.

CERTIFICATION *of Aſſize of novel Diſſeiſin*, a writ granted for the re-examining paſſed-by aſſizes, before juſtices. This writ is uſed where a perſon appears, by his bailiff, to an aſſize brought by another, and has loſt the day.

CERTIORARI, a writ which iſſues out of the chancery, directed to an inferior court, to call up the records of a cauſe there depending, in order that juſtice may be done: And this writ is obtained upon complaint that the party who ſeeks it has received hard uſage, or is not like to have an impartial trial in the inferior court. A certiorari is made returnable either in the King's-Bench, Common-Pleas, or in Chancery.

It is not only iſſued out of the court of chancery, but likewiſe out of the King's-Bench, in which laſt-mentioned court it lies where the king would be certified of a record. Indictments from inferior courts, and proceedings of the quarter-ſeſſions of the peace, may alſo be removed into the King's Bench by a certiorari; and here the very record muſt be returned, and not a tranſcript of it; though uſually in chancery, if a certiorari be returnable there, it removes only a tenor of the record.

CERTITUDE, conſidered in the things or ideas which are the objects of our underſtanding, is a neceſſary agreement or diſagreement of one part of our knowledge with another; as applied to the mind, it is the perception of ſuch agreement or diſagreement, or ſuch a firm well-grounded aſſent as excludes not only all manner of doubt, but all conceivable poſſibility of a miſtake.

There are three ſorts of certitude, or aſſurance, according to the different natures and circumſtances of things:

1. A phyſical or natural certitude, which depends upon the evidence of ſenſe; as that I ſee ſuch or ſuch a colour, or hear ſuch or ſuch a ſound: no-body queſtions the truth of this, where the organs, the medium, and the object are rightly diſpoſed. 2. Mathematical certitude is that ariſing from mathematical evidence; ſuch is, that the three angles of a triangle are equal to two right ones. 3. Moral certitude is that founded on moral evidence, and is frequently equivalent to a mathematical one; as that there was formerly ſuch an emperor as Julius Cæſar, and that he wrote the commentaries which paſs under his name, becauſe the hiſtorians of thoſe times have recorded it, and no man has ever diſproved it ſince. This affords a moral certitude, in common ſenſe ſo great, that one would be thought a fool or a madman for denying it.

CERT-MONEY, a fine paid yearly by the reſidents of ſeveral manors to the lord thereof, and ſometimes to the hundred, *pro certo lete*, that is, for the certain keeping of the leet.

CERVICAL NERVES, in anatomy, are eight pair of nerves, ſo called as having their origin in the neck. See NERVE.

From theſe eight pair there are innumerable branches diſtributed through the muſcles of the head, the neck, the ſcapula, and the humerus: from the third pair in particular, there is a branch which runs up to the ear: from the third, fourth, and fifth pair are formed the nerves of the diaphragm, which paſſing thro' the neck and breaſt, deſcend into the diaphragm; the ſixth, ſeventh, and eighth of theſe, after they have been joined by various anaſtomoſes, form the ſix robuſt nerves of the arm. To this diviſion is the ſpinal acceſſory nerve of Willis to be referred, as a ſort of ninth pair of nerves of the neck; this ariſes from the ſpinal marrow, about the origin of the third or fourth pair, and paſſes through the great foramen in the os occipitis up into the cranium.

CERVICAL VESSELS, in anatomy, denote the arteries, veins, &c. which paſs through the vertebræ, and muſcles of the neck, up to the ſkull.

CERVICALES DESCENDENTES, a pair of muſcles, antagoniſts to the ſacro-lumbares, coming from the third, fourth, fifth, and ſixth vertebræ of the neck.

CERVIX, in anatomy, denotes properly the hinder part of the neck, as contradiſtinguiſhed from the fore part, called *jugulum*, or the throat. See NECK.

CERVIX *of the Uterus*, or the neck of the uterus, that oblong canal or paſſage between the internal and external orifices of the womb, which receives and incloſes the penis, like a ſheath; whence it is alſo called vagina. See the articles UTERUS and VAGINA.

In maids it is very narrow, except in the time of the menſes, being ſcarce wide enough to admit a gooſe-quill: Its inner extremity is called the oſculum internum, or the internal mouth of the womb; it opens into the vagina in form of the glans penis in men: this part is alſo very ſmall in virgins; but in women who have had children, or who are big with child, it is larger; and in the laſt it is always cloſed up with a glutinous humour. In the time of delivery, it, in a wonderful manner, expands itſelf ſo as to give paſſage to the child. See DELIVERY.

CERUMEN, ear-wax, or that natural excrement collected in the meatus auditorius, and diſcharged from the glands of thoſe parts through the membrane which lines them. It is fluid on its firſt diſcharge, but by its continuance it becomes thicker, more ſolid, viſcid, of the conſiſtence of clay, and of a bitteriſh taſte.

CERUSE, or CERUSS, white-lead, a ſort of calx of lead, made by expoſing plates of that metal to the vapour of vinegar.

The beſt way of preparing it is the following, as recommended by Boerhaave: A glaſs-cucurbit is to be cut off in ſuch a manner, as to leave it a very long mouth; an alembic-head of glaſs is to be fitted to this; ſome vinegar is to be put into the body, and a number of thin plates of lead are to be placed in the head, in ſuch a manner that they may ſtand ſomewhat erect: when the head is fitted on, the body is to be ſet in a gentle ſand-heat for twelve hours; then unluting the veſſels, the receiver, which had been fitted to the noſe of the head, will contain a ſweet and ſtyptic liquor, nauſeous and turpid, called the vinegar of lead, or the ſolution of lead: and the plates of lead taken out of the head will be found covered with a white duſty matter: this is ceruſs; and if the operation be repeated, the whole quantity of lead will be in fine reduced to this ſtate of ceruſs.

Ceruſs is uſed externally, either mixed in ointments, or by ſprinkling it on old gleeting and watery ulcers, and in many diſeaſes of the ſkin. If, when it is reduced into a fine powder, it is received in with the breath in inſpiration, and carried down into the lungs, it cauſes terrible aſthmas, that are almoſt incurable, and at laſt generally prove fatal. Sad inſtances of the very pernicious effects of this metal are too often ſeen among thoſe perſons who work lead in any form, but particularly among the workers in white lead.

The painters uſe it in great quantities, and, that it may be afforded cheap to them, it is generally adulterated with common whiting; the Engliſh and Dutch ceruſs are very bad in this reſpect: the Venetian ought always to be uſed by apothecaries.

CERUSS *of Antimony*, a medicine prepared by diſtilling powdered regulus of antimony with ſpirit of nitre, till no more fumes ariſe; what remains in the retort being pulveriſed and waſhed, makes the ceruſs of antimony, which is eſteemed a powerful diuretic.

CERVUS, the ſtag or deer-kind, in zoology, a genus of quadrupeds of the order of the pecora; the characters of which are, that they have deciduous horns, at firſt hairy, and afterwards naked and ſmooth; add to this, that there is only one dog-tooth on each ſide of the upper jaw, and that placed at a diſtance from the other teeth.

Under this genus are comprehended the camelo-pardalis, the alce or elk, the rangifer or rein-deer, the capreolus, and the ſtag and fallow-deer. See the articles CAMELO-PARDALIS, &c.

CERVUS VOLANS, in zoology, the name of the ſtag-horned beetle, a remarkably large ſpecies of beetle, with its horns deeply jagged or ramified, ſomewhat like thoſe of a ſtag.

CESARE, anmog logicians, one of the modes of the ſecond figure of ſyllogiſms, the minor propoſition of which is an univerſal affirmative, and the other two univerſal negatives: thus

CE. No immoral books ought to be read:
SA. But every obſcene book is immoral:
RE. Therefore no obſcene book ought to be read.

CESSATION, *Ceſſatio a Divinis*, in the Romiſh church, is when, for any notorious injury to the church, a ſtop is put to all divine offices and the adminiſtration of the ſacraments, and Chriſtians are deprived of church-burial. A ceſſation differs from an interdict in this, that, during the latter, divine ſervice may be performed in ſuch churches of any place interdicted, as are not expreſly under the interdict, and even be celebrated ſolemnly on certain high feſtivals, the church doors being ſhut: but in a ceſſation, no religious ſervice can be performed ſolemnly; the only liberty allowed is, in order to renew the conſecrated hoſts, to repeat, every week, a private maſs in the pariſh churches, the doors being ſhut, obſerving alſo not to ring the bell.

CESSAVIT, in law, a writ that lies upon this general ground, that the perſon againſt whom it is brought has for two years neglected to perform the ſervice, or to pay the rent he is obliged to by his tenure, and has not upon his lands ſufficient goods or chattels to be diſtrained.

An heir cannot maintain a writ of ceſſavit for ceſſure made in the time of his anceſtor, unleſs it be in caſe of fee-farm rents by ſtatute.

Cessavit De Cantaria is where a perſon gives land to a religious houſe, to ſay divine ſervice, or provide alms for the poor. If the ſaid ſervices are not performed in two years, then the donor, or his heirs, ſhall have this writ againſt the perſon that holds the lands.

CESSION, in law, an act by which a perſon ſurrenders and tranſmits to another perſon, a right which belonged to himſelf. Ceſſion is more particularly uſed in the civil law for a voluntary ſurrender of a perſon's effects to his creditors, to avoid impriſonment. A debtor cannot be admitted to the benefit of ceſſion, unleſs by virtue of letters patent, confirmed in court by the creditors; and in order to obtain that favour, he muſt make it appear that he has no reſource left for payment, nor cannot be reproached with villany or fraud. Ceſſion implied a mark of infamy, and obliged the perſon to wear a green cap, which was intended to ſignify, that the ceſſionary was become poor through his own folly. The Italian lawyers deſcribe the ceremony of ceſſion to conſiſt in ſtriking the bare poſteriors three times againſt a ſtone, called *lapis vituperii*, in the preſence of a judge. Formerly it conſiſted in giving up the girdles and keys in court.

There are ſeveral debts for which a perſon cannot be admitted to make a ceſſion of his eſtate; ſuch are thoſe occaſioned by a depoſit of public or private money, and in general all thoſe debts accompanied with fraud or perfidy on the part of the debtor: perſons condemned in a fine, or damages, for any crime, are alſo excluded from the benefit of ceſſion; as are merchants who buy in groſs to ſell in detail, ſtrangers, maſters for the wages of their ſervants, perſons who have embezzled the public money, &c. The ceſſion of goods does not liberate a debtor; ſo that whatever riches he may afterwards acquire, the creditors can ſeize for their own payment: they are obliged, however, to allow him a livelihood.

CESSION, in the eccleſiaſtical law, is when an eccleſiaſtical perſon is created a biſhop, or when a parſon of a pariſh takes another benefice without diſpenſation, or being otherwiſe qualified. In both theſe caſes their firſt benefices become void by ceſſion, without any reſignation; and to thoſe livings that the perſon had, who was created biſhop, the king may preſent for that time, whoſoever is patron of them; and in the other caſe the patron may preſent: but by diſpenſation of retainder, a biſhop may retain ſome or all the preferments he was intitled to before he was made biſhop.

CESTRUM, in botany, a genus of plants, the flower of which is monopetalous, of a funnel-form, with a cylindrical and very long and ſlender tube, and a plane plicated limb, divided into five equal ovated ſegments; the fruit is an oblong oval berry, with one cell, containing numerous roundiſh ſeeds.

CESTUI, a French word, ſignifying *he* or *him*, frequently uſed in our law writings. Thus *ceſtui qui truſt*, a perſon who has lands, &c. committed to him for the benefit of another; and if ſuch perſon does not perform his truſt, he is compellable to it in chancery.

Cestui Qui Vie, one for whoſe life any lands, &c. are granted.

Certui Qui Use, a perſon to whoſe uſe any one is infeoffed of lands or tenements. Formerly the feoffees to uſes were deemed owners of the land, but now the poſſeſſion is adjudged in *ceſtui qui uſe*.

CESTUS, among ancient poets, a fine embroidered girdle ſaid to be worn by Venus, to which Homer aſcribes the faculty of charming and conciliating love.

CETACEOUS, an appellation given to a claſs or order of fiſhes, otherwiſe called plagiuri. See the article Plagiuri.

The term cetaceous, though properly only applicable to the whale kind, has nevertheleſs been uſed to denote any large fiſh, as the ſhark, ſea-fox, &c.

CETERACH. See the article Asplenium.

CETUS, in aſtronomy, a conſtellation of the ſouthern hemiſphere, comprehending twenty-two ſtars in Ptolemy's catalogue, twenty-one in Tycho Brahe's, and in the Britannic catalogue ſeventy-eight.

CEVADILLA, in botany, Indian cauſtic barley, the ſeed veſſel of a Mexican plant, reſembling in its form and ſtructure a barley ear, but with ſmaller ſeeds, not above the ſize of linſeed.

Theſe ſeeds appear, from the accounts given of them by authors, to be the ſtrongeſt of the vegetable cauſtics. Monardes reports, that in putrid verminous ulcers, and gangrenes, they have the ſame effects as corroſive ſublimate, or the actual cautery; and that the way of uſing them is to ſprinkle a little of the powdered ſeed upon the part, or for the greater ſafety, to dilute it with watery liquors, and apply lint dipt in the mixture. In France, they are ranked among the officinals: in this country they are very rarely to be met with.

CHÆROPHYLLUM, chervil, in botany, an umbelliferous plant, with winged leaves ſomewhat like thoſe of parſley, producing ſmooth longiſh ſeeds, ſhaped like a bird's beak. It is a native of the ſouthern parts of Europe, and ſown annually with us in gardens.

Chervil is a ſalubrious culinary herb; ſufficiently grateful, both to the palate and ſtomach; ſlightly aromatic; gently aperient and diuretic. The expreſſed juice is recommended, by Riverius and others, in dropſies; and Geoffroy relates, that he has found it, from experience, of remarkable ſervice in this diſeaſe; that it acts mildly and without irritation, and abates inflammatory ſymptoms. He directs three or four ounces of the depurated juice, with ſeven or eight grains of nitre, and half an ounce of a ſyrup of the five opening roots, to be taken daily every four hours; though he intimates alſo that the chervil juice has ſucceeded without any aſſiſtance. He obſerves that it is to be uſed with caution where the patient is troubled with a cough or a ſpitting of blood, as being liable to aggravate theſe complaints, in conſequence of a nitrous ſalt, by virtue of which he ſuppoſes this juice to act.

CHÆTIA, in zoology, a genus of inſects, of the order of the apteria, the characters of which are theſe: the body is long, ſlender, and rounded, reſembling a hair, or a piece of fine thread; and hence called, in Engliſh, the hair-worm, or Guinea-worm.

CHAFERY, a forge in an iron-mill, where the iron is hammered out into complete bars, and brought to perfection.

CHAFE-WAX, an officer in the chancery, who fits the wax for ſealing writs, patents, and other inſtruments iſſued out from thence.

CHAFF, in huſbandry, the refuſe or ſtraw that is ſeparated from corn, by ſcreening or winnowing it.

CHAFFERCOUNCES, printed linens manufactured in the Mogul's dominions, and imported to Europe by way of Surat.

CHAFFERS, in our old records, ſignify wares or merchandize; and hence the word chaffering is uſed for buying and ſelling.

CHAFF-FINCH, in ornithology, the Engliſh name of the fringilla, with a red-coloured breaſt, and black wings ſpotted with white. See Fringilla.

The chaff-finch is a hardy bird, living upon any kind of ſeeds.

CHAIN, *Catena*, a long piece of metal compoſed of ſeveral links, or rings, engaged the one in the other. They are made of divers metals, ſome round, ſome flat, others ſquare; ſome ſingle, ſome double; and ſerve to ſo many uſes, that it would be tedious to give a particular account of them all.

Chain alſo implies a ſtring of gold, ſilver, or ſteel-wire, wrought like a tiſſue, which ſerves to hang watches, tweezer-caſes, and other valuable toys upon. The invention of theſe pieces of workmanſhip was derived originally from England, whence foreigners give them the name of chains of England.

In making theſe chains, a part of the wire is folded into little links, of an oval form, the longer diameter about three lines, the ſhorter one and a half. Theſe, after they have been exactly ſodered, are again folded into two, and then bound together and interwoven by means of ſeveral other little threads of the ſame thickneſs, ſome of which paſſing from one end to the other, imitate the warp of a ſtuff, and the others, which paſs tranſverſely, the woof; there are at leaſt four thouſand little links in a chain of four pendants, ſo equally and at the ſame time ſo firmly connected, that the eye takes the whole to conſiſt of one piece.

Chains, in naval affairs, ſtrong plates or links of iron bolted to the timbers on each ſide of all the maſts, by which the ſhrouds of the maſts are drawn tight and faſtened. There is a broad plank or thick ſcaffold, called the channel, placed edge-ways on the ſhip's ſide, through which they paſs in order to keep the ſhrouds off the upper-rails and gunnels; that is, the upper-part of the ſhip's ſide.

Chain-Shot, in artillery, is formed by baving a ſhort chain which faſtens two cannon-balls together. Theſe are more particularly uſed in the ſea-ſervice for cutting and mangling a ſhip's rigging, and carrying away her maſts.

Chain-Pump. See the article Pump.

Chain, in ſurveying, an inſtrument of iron-wire, diſtinguiſhed into an hundred equal parts, called links, being uſed to meaſure lengths in ſurveying of land. They are of ſeveral ſorts, as

1. A chain of 100 feet long, each link being one foot; at each tenth foot there is a plate of braſs, with a figure engraved upon it, ſhewing readily how many links are from the beginning of the chain; and for more eaſe in reckoning, there is, or ſhould be, a braſs ring at every five links; that is, one between every two plates.

This chain is moſt convenient for meaſuring large diſtances.

2. A chain of 16 $\frac{1}{2}$ feet in length, and made ſo as to contain a hundred links, with rings at every tenth link. This chain is moſt uſeful in meaſuring ſmall gardens or orchards, by perch or pole meaſure.

3. A chain of four poles or perches in length, called Gunter's chain, which is 66 feet, or 22 yards; for each perch contains 16 $\frac{1}{2}$ feet. This whole chain is divided into 100 links; whereof 25 is an exact perch or pole; and for readily accounting there is uſually a remarkable diſtinction by ſome plates or large ring, at the end of 25 links; alſo at the end of every tenth link it is uſual to faſten a plate of braſs with notches in it, ſhewing how many links there are from the beginning of the chain; and this chain, of all others, is the moſt convenient for land meaſure.

When you are to meaſure any line by this chain, you need have regard to no other denomination than chains and links only, which ſet down with a full point between them. Thus, for example, if you find the ſide of a cloſe to be 10 chains 14 links, it muſt be ſet down thus, 10. 14.

But if the links be under 10, a cypher muſt be prefixed; thus 10 chains 7 links muſt be ſet down 10. 07.

Then if the field, &c. be a ſquare or parallelogram, if you multiply the length expreſſed in chains and links, by the breadth expreſſed in the ſame manner, and cut off five figures from the product, thoſe toward the left hand will be acres; then multiply the figures ſeparated by four, cutting off the ſame number of figures, and you will have the roods, or quarters of an acre; and laſtly, multiply the remaining figures by 40, cutting off five as before, and you will have the ſquare perches.

Example. Let it be required to find the area of a field, in form of a parallelogram, whoſe length is 14 chains 10 links, and breadth 6 chains 5 links.

Then $14.10 \times 6.05 = 8.53050$; and $.53050 \times 4 = 2.12200$; and $.12200 \times 40 = 4.88000$. So that the area of the field is eight acres, 2 roods, and almoſt 5 perches.

The ſame method muſt be taken to find the area of all other figures, regard being had to the methods laid down under each; viz. for triangles to multiply the baſe by half the perpendicular, &c.

To take an Angle as B A C (plate XXXVII. *fig.* 7.) *by the* Chain.

Meaſure along the ſide A B any ſmall diſtance as A D, and meaſure the like diſtance along the ſide A C to E; then meaſure the diſtance D E, which will be the chord of the angle B A C, or arch E D. To plot this angle, draw the line A B, at pleaſure, and ſet off on it the diſtance A D, and from the center A, with the radius A D, deſcribe the arch D E, ſetting off on it the diſtance D E, from D to E, and from A draw A C, through the point E, and you have the angle required.

By this method you may ſurvey a field, by meaſuring the ſides and angles. But if the field has but four angles, you need only meaſure the ſides, and one of the angles, as B A C; for when that is plotted according to the foregoing directions, and the lengths of the ſides being ſet off from A to B and C, if you take the length of the ſide C D in the compaſſes, and ſetting one foot in C, deſcribe a ſmall arch; alſo with the length of the ſide B D, one foot being placed in B, croſs the former arch in D, then draw the lines C D and B D; you will have the true plot of the field required.

CHAIR, *Cathedra*, was anciently the ſuggeſtum, or pulpit, whence the prieſt or public orator ſpoke to the people. See the article Cathedra.

It is ſtill applied to the place whence profeſſors or regents in the univerſities, deliver their lectures: thus we ſay, the profeſſor's chair. It is alſo applied to the chief magiſtrate of a city, or rather to the ſeat appropriated to his office: thus we ſay, next the chair.

Curule **Chair**, an ivory ſeat placed on a car, wherein were ſeated the chief magiſtrates of Rome, and thoſe to whom the honour of a triumph was granted.

Chair-Man, the preſident or ſpeaker of an aſſembly. See President.

CHALAZA, among naturaliſts, a white knotty ſort of ſtring at each end of an egg, formed of a plexus of the fibres of the membranes, whereby the yolk and white are connected together. See Egg.

CHALCANTHA, in natural hiſtory, a kind of compound ſalts, of a coarſe and irregular ſtructure, conſiderably hard, and naturally impure and opake.

CHALCEDONY, *Chalcedonius*, in natural hiſtory, a genus of ſemi-pellucid gems, of an even and regular, not tabulated texture; of a ſemi-opake, cryſtalline baſis, and variegated with different colours, diſperſed in form of miſts and clouds; and if nicely examined, found to be owing to an admixture of various kinds of earths, but imperfectly blended in the maſs, and often viſible in diſtinct moleculæ.

Of this genus there are a great many ſpecies, as the bluiſh-white chalcedony; the browniſh-black chalcedony, or ſmoaky jaſper or capnitis of the ancients; and the yellow and red chalcedony.

All the chalcedonies give fire readily with ſteel, and make no efferveſcence with aqua-fortis.

CHALCIDICA, or **Chalcidicum**, in ancient architecture, a magnificent hall belonging to a tribunal or court of juſtice. Some writers make it the court where affairs of coinage were regulated; others, the mint itſelf. Vitruvius uſes it for the auditory of a baſilica; and ſometimes it expreſſes the apartment where the gods were imagined to eat.

CHALCITIS, the name given by the ancients to the browniſh-red chalcanthum, of a ſoft and friable ſubſtance, and ſhewing a very irregular ſurface when broken; being compoſed of five or ſix ſeries of ſhort, waved, and undulated ſtriæ.

It is found in many parts of the Turkiſh dominions, and is given internally by ſome after calcination, in fluxes and hæmorrhages.

CHALDEAN *Philoſophy*. It is no eaſy matter to give a juſt idea of the Chaldean philoſophy; the monuments which remain of it are much leſs ancient than the ſect itſelf: what we can gather from the Greeks ſeems but of ſmall authority, and will give us but little inſight; for the Greeks had a turn of genius quite different from the Orientals. They altered every thing they received from other nations, whom, with an air of contempt, they called barbarous. Another reaſon which ſhould make us doubtful in determining what were the real opinions of the Chaldeans, is this, that they kept the dogmas of their ſect a ſecret among themſelves; none were admitted to the knowledge of them, but privileged diſciples; they never publiſhed them but under the veil of allegories, or ſymbols. Thus we can only form conjectures from what the Greeks and Arabians have tranſmitted to us. Hence that diverſity of opinions among the learned on this head, who, inſtead of explaining, have rendered it more obſcure and myſterious; witneſs a ſect of philoſophers who appeared in Aſia, much about the time of our Saviour's birth. Theſe men, to give weight to their dreams and idle doctrines, reſolved to colour them with the air of great antiquity, and made them paſs under the name of Chaldean and Perſian, as the precious remains of the doctrines of thoſe philoſophers: in conſequence of which, they forged a great number of works in the name of the famous Zoroaſter, who was then looked upon in Aſia as the chief and maſter of all the magi in Perſia and Chaldea. Many men of eminent learning, both ancient and modern, have taken a great deal of pains to diſcover who this Zoroaſter was, ſo much boaſted of in the Eaſt: but after all their diſquiſitions, have been forced to acknowledge themſelves in the dark.

The Chaldeans acknowledged a Supreme Being, author of all things, who eſtabliſhed that beautiful harmony which connects the univerſe. Though they thought matter eternal and pre-exiſtent to the operation of God, yet they did not ſuppoſe the world eternal; for their coſmogony repreſents our earth as an opaque chaos, wherein all the elements were confuſedly blended together, before it received that order and arrangement which rendered it habitable. They ſuppoſed, that monſtrous animals, of various forms, were born in the womb of this rude chaos, and were ſubject to a woman named Omerca: that the God Belus cut her in two; of one-half he made the heavens, of the other the earth, and that the death of this woman deſtroyed all the monſtrous animals before-mentioned; that Belus, after having formed the world, and produced the living creatures in it, cauſed his own head to be cut off; that men and animals were produced out of the earth; that other gods dipped men in the blood which flowed from the wound of the god Belus; and that this was the reaſon why men were endowed with intellectual faculties, becauſe they had received a part of the deity.

The fragments of Beroſus, preſerved by Syncellus, obſerve, that this coſmogony is nothing but a myſterious allegory, by which the Chaldeans expreſſed the creation of the world. This allegory indicates, that man owes his creation and birth immediately to God, and that the Supreme Being made uſe of another god, for the creation of the world. This opinion was univerſally received all over the Eaſt. They thought it beneath the majeſty of the ſupreme God to preſide immediately over the world; that all-perfect as he was, he confined his contemplations to his own perfections, not concerning himſelf about poor mortals, but left the care of them to inferior local and tutelary deities. In honour of theſe only, incenſe ſmoaked, and the blood of victims flowed upon the altars. But beſides the good genii, who delighted in doing good to mankind, they admitted alſo of evil genii; theſe laſt they ſuppoſed to be formed of groſſer matter than the firſt, and that a continual war ſubſiſted between them; the firſt proceeded from the good principle, the latter from the bad. Hence it appears, that the doctrine of the two principles firſt aroſe in Chaldea, from whence it was propagated to the Perſians, and prevailed univerſally, almoſt, among the Orientals. This doctrine ſeems to owe its riſe to the ſacred hiſtory of the fall of the firſt man; for, according to them, theſe dæmons aſſumed all ſhapes, at pleaſure, to delude thoſe who liſtened to them. Such were the myſteries in which the Chaldeans initiated a ſmall number of adepts, who were to ſucceed them, and hand the tradition down from one age to another.

The doctrine they taught in public, according to Herodotus and Diodorus Siculus, was, that the ſun, moon, and ſtars, eſpecially the planets, were deities which muſt be adored. The ſtars principally in veneration among them, were the ſigns of the zodiac, without taking any thing from the dignity of the ſun and moon, which they looked on as primary deities. They called the ſun Belus, the moon Nebo, or Nergal. The common people, born to be dupes to thoſe who have wit enough to gain the aſcendant over them, thought a deity reſided in every ſtar, and, conſequently, that ſo many gods deſerved their adoration. As to the ſages and philoſophers of the country, they contented themſelves with placing their genii, or deities of a lower claſs, in them, as directors of their different motions.

This principle once eſtabliſhed, it was not difficult for them to perſuade the people, that the ſtars had a great influence on the happineſs or miſery of mankind; and hence ſprung judicial aſtrology, in which the Chaldeans had the reputation of excelling, inſomuch that all eminent in this ſcience were called Chaldeans. Theſe quacks, like our fortune-tellers, pretended to read in the ſtars human deſtinies and future events: but the reality of this ſcience depended upon the credulity of the people; for what connection can there be between the regular motion of the ſtars and the free events of the will? The eager curioſity of prying into futurity is a diſtemper as ancient as the world, but has exerciſed its dominion moſt among the Orientals, who are conſtitutionally of a warm imagination. It is incredible to what extravagance this has prevailed, by the cunning artifices of the prieſts: judicial aſtrology was the ſtrongeſt rein by which they always ruled the people of the Eaſt. Sextus Empiricus declaims, with much ſtrength and eloquence, againſt this trifling art, ſo baneful to the happineſs of mankind, by the evils it neceſſarily produces. The Chaldeans, in ſhort, ruled the people with a rod of iron, which their own ſuperſtition impoſed on themſelves; for nothing could be done without conſulting the augurs and aſtrologers. Notwithſtanding the credulity of the people, the impoſture of judicial aſtrology was too groſs not to betray itſelf. Under the conſulate of M. Popilius and Cneius Calpurnius, it was decreed, by an edict of the Prætor Cor. Hiſpallus, that the Chaldeans ſhould depart from Rome, and all Italy, within the ſpace of ten days; and the reaſon aſſigned by the edict was, that they abuſed weak and credulous minds, by their pretended knowledge of the ſtars. Alexander himſelf, who was at firſt very much prejudiced in favour of the Chaldeans, deſpiſed them after Anaxarchus ſhewed him the vanity of judicial aſtrology.

Though aſtronomy was in very great eſteem among the Chaldeans, and they cultivated it very much, yet they do not ſeem to have made any conſiderable progreſs in it. What aſtronomers muſt they have been to ſuppoſe the eclipſes of the moon to have proceeded from her turning her opaque ſide towards the earth; and that the other was always luminous of itſelf, independent of the ſun? Where had they learned that the terreſtrial globe ſhould be conſumed by fire, on a conjunction in the ſign Cancer, and be drowned on a conjuction in the ſign Capricorn? Yet the Chaldeans have paſſed for great aſtronomers. Pretences to antiquity have been the foible of all nations, and a thouſand abſurdities are owing to it. The Chaldeans, in the time of Alexander the Great, pretended, that aſtronomy had flouriſhed in Chaldea four hundred and ſeventy thouſand years; but this is not probable, and only exiſted in the warm imaginations of the Chaldeans. Calliſthenes, who accompanied Alexander in his military expeditions, ſent the account of the obſervations he had found at Babylon to Ariſtotle: theſe obſervations went no farther back than one thouſand nine hundred and three years; which, if they are ſuppoſed to begin at the four thouſand three hundred and eighty-third year of the Julian period, when Babylon was taken, will go no higher than the two thouſand four hundred and eightieth year of the ſame period. This falls very ſhort of the chronological ſyſtem of Moſes, according to the verſion of the Septuagint, carried back no farther than the flood. If the Chaldeans had made more ancient obſervations, how came Ptolemy, who was ſo exact an aſtronomer, not to mention them, and ſpeak of none till the firſt year of Merodach, king of Babylon, which falls on the twenty-ſeventh year of the æra of Nabonaſſar? The pretended antiquity of the Chaldean obſervations no more deſerve our credit, therefore, than Porphyrius who builds upon them. Epigenius affirms the aſtronomical obſervations, found on the baked bricks at Babylon, go no farther back than ſeven hundred and twenty years; and, as even this is too long a ſpace of time to be juſtified by hiſtory, Beroſus and Critodemus have ſhortened it to four hundred and eighty years.

After this, who would not laugh to ſee the Chaldeans gravely preſenting us with their aſtronomical obſervations,

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in ſupport of their antiquity, when their own authors give them the lye? They certainly, as Lactantius ſays, thought, by going ſo far back as four hundred and ſeventy thouſand years, to give a ſort of ſanction to their antiquity, and make it leſs ſuſpected; but in this they were miſtaken; for all chronology, not ſupported by facts, is not hiſtorical, and conſequently proves nothing in favour of the antiquity of a nation. When we once know the courſe of the ſtars, we can foreſee, from their regular motion, the conjunctions, oppoſitions, &c. which ſhall happen at any future time, and may conſequently, by calculation, find out theſe phænomena, in any time paſt, of the ſame date; but theſe calculations, and a ſyſtem of ſuch obſervations, purely arbitrary in point of time, no more prove the world to have exiſted from eternity, than that it ſhall laſt to eternity. Such is the caſe of the ancient Chaldeans, with regard to their obſervations of four hundred and ſeventy thouſand years: if a ſucceſſion of hiſtorical facts were annexed to theſe obſervations, credit ought to be given to them; but, as no ſuch appear, they are only to be looked on as the dreams of a calculator.

CHALDRON, an Engliſh dry meaſure, conſiſting of thirty-ſix buſhels, heaped up according to the ſealed buſhel kept at Guild-hall, London: but on ſhip-board, twenty-one chaldron of coals are allowed to the ſcore.

CHALICE, the cup or veſſel uſed to adminiſter the wine in the ſacrament; and by the Roman catholics in the maſs.

The uſe of the chalice, or communicating in both kinds, is, by the church of Rome, denied to the laity, who communicate only in one kind, the clergy alone being allowed the privilege of communicating in both kinds.

CHALK, in natural hiſtory, the Engliſh name of the white, dry marle, with a duſty ſurface, found in hard maſſes, and called by authors, *creta*, and *terra creta*.

Chalk thrown into water, raiſes a great number of bubbles, with a hiſſing noiſe, and ſlowly diffuſes itſelf into an impalpable powder. It ferments more ſtrongly with acids than any other earth, and burns to lime.

As a medicine, chalk deſerves, perhaps, the higheſt place among the alkaline abſorbents; nor is it leſs uſeful in many of the ordinary affairs of life. Its uſe in cleaning various utenſils is well known, and it is in no ſmall repute as a manure, eſpecially for cold ſour lands; in which intention the ſoft unctuous chalk is moſt proper, as the dry, hard, and ſtrong chalk is for lime. It is a great improver of lands, and will even change the very nature of them: however, it is moſt adviſeable to mix one load of chalk, with two or three of dung, mud, or freſh mould, whereby it will become a laſting advantage to the ground: the common allowance is fourteen loads of chalk to every acre.

Black CHALK, among painters, denotes a kind of ochreous earth, of a cloſe ſtructure, and fine black colour, uſed in drawing upon blue paper.

Red CHALK, an indurated clayey ochre, common in the colour-ſhops, and much uſed by painters and artificers.

CHALKY-LAND, that lying on a chalky bottom, whereby it is ſtrongly impregnated with the virtues of the chalk.

Theſe lands naturally produce may-weed, poppies, &c. Saintfoin and trefoil likewiſe agree with them; and their beſt produce of corn is barley or wheat, though oats will likewiſe do well on them.

The beſt manure for chalky lands is rags, dung, and folding of ſheep. If rain happens to fall on them juſt after ſowing, it binds the earth ſo hard, that the corn cannot paſs through it; to prevent which misfortune, it is uſual to manure theſe lands with half-rotten dung, with which ſome mix ſand.

CHALLENGE, a cartel, or invitation to a duel, or other combat. See the article DUEL.

CHALLENGE, in law, is an exception made to jurors, who are returned to a perſon on a trial.

This challenge is made either to the array, or to the polls; to the array, when exception is taken to the whole number of jurors impannelled; and to the polls, when an exception is made to one or more of the jury as not indifferent.

Challenge to the jurors is likewiſe divided into challenge principal or peremptory, and challenge for cauſe; that is, upon cauſe or reaſon alledged. Challenge principal is what the law allows without any cauſe alledged, or further examination: as a priſoner arraigned at the bar for felony, may challenge peremptorily the number allowed him by law, being twenty, one after another, alledging no further cauſe than his own diſlike: and the jurors, ſo challenged, ſhall be put off, and new ones taken in their places.

In caſes of treaſon and petit-treaſon, the number of thirty-five jurors may be peremptorily challenged, without ſhewing any cauſe; and more, both in treaſon and felony, may be challenged, ſhewing cauſe.

If thoſe who proſecute for the king challenge a Juror, they are to aſſign the cauſe; and if the cauſe alledged be not a good one, the inqueſt ſhall be taken. When the king is party, if the other ſide challenge any juror above the number allowed, he ought to ſhew cauſe of his challenge immediately, while the jury is full, and before they are ſworn.

There may be a principal cauſe of challenge in civil actions, and a challenge for favour. The principal challenge is in reſpect of partiality, or default of the ſheriff, &c. Challenge for favour, is when the plaintiff or defendant is tenant to the ſheriff, or if the ſheriff's ſon has married the daughter of the party, &c.

CHALLENGE, among hunters. When hounds or beagles, at firſt finding the ſcent of their game, preſently open and cry, they are ſaid to challenge.

CHALYBEAT, in medicine, an appellation given to any liquid, as wine or water, impregnated with particles of iron or ſteel.

Dr. Short, in his hiſtory of the mineral waters, has claſſed them into the warm purging chalybeat, diuretic chalybeat, purging and plain ſulphur-waters.

Of the warm purging chalybeat waters, that of Buxton ſeems to be the principal. See the article BUXTON-WELLS.

The purging chalybeat contains a mineral ſpirit, ſulphur, vitriol, nitre, and ſea-ſalt, with a calcarious earth, of which ſome particles are attracted by the load-ſtone, which proves them to be iron: of theſe the Scarborough-ſpa is now in greateſt reputation. See SCARBOROUGH-SPA.

The diuretic chalybeat water conſiſts of much the ſame principles with the former claſs, only the ſalts are in leſs proportion; of theſe there are great numbers in Yorkſhire.

Dr. Monro, profeſſor of anatomy at Edinburgh, by pouring a tincture of galls into common water, and diſſolving therein a ſmall quantity of ſal martis, adding ſome filings of iron and oil of vitriol, procured a water exactly like the natural chalybeat water; and he is of opinion, that where theſe waters are not to be had, the artificial water may be made to anſwer all their intentions, according to its being more or leſs cloſely kept, or expoſed in the air or heat, &c. *Vide Med Eſs. Edinb.*

CHAMA, in the hiſtory of the ſhell-fiſh, is reckoned by Linnæus a ſpecies of concha, diſtinguiſhed by its convex, equal, and patent valves. See CONCHA.

CHAMADE, in war, a ſignal made by beat of drum for a conference with the enemy, when any thing is to be propoſed; as a ceſſation of arms to bring off the dead, or a ſignal made by the beſieged when they have a mind to deliver up a place upon articles of capitulation: in which caſe there is a ſuſpenſion of arms, and hoſtages delivered on both ſides.

CHAMÆCERASUS, the dwarf honey-ſuckle, makes a diſtinct genus of plants, according to ſome; but Linnæus comprehends it under lonicera. See the article LONICERA.

CHAMÆDRYS, germander, in botany, a low creeping ſhrubby plant, with ſquare ſtalks, ſmall ſtiff oval leaves, notched from about the middle to the extremity, like thoſe of the oak tree, ſet in pairs at the joints; and purpliſh labiated flowers, not thick together, wanting the upper lip. It grows wild in ſome of the woods of France, Germany, and Switzerland: with us it is raiſed in gardens, and flowers in June and July.

The leaves and tops of germander have a moderately bitter taſte, accompanied with a weak aromatic flavour, which is diminiſhed a little in drying, but not totally diſſipated in keeping for ſeveral months. They ſtand recommended as mild aperients and corroborants, in uterine and other obſtructions, intermitting fevers, ſcrophulous diſorders, and in the rheumatiſm and gout. They make a principal ingredient in the alterative antiarthritic compoſitions preſcribed by the ancients; whoſe uſe has lately been revived, with little variation, and which are ſaid, when long perſiſted in, by ſtrengthening the habit, rendering the blood more fluid, and promoting perſpiration, to prevent returns of the gouty paroxyſms. In ſome arthritic caſes, theſe and other warm bitter medicines have been of conſiderable ſervice: in others, they have been continued for years without any apparent benefit; in others, particularly in hot diſpoſitions, in perſons of an advanced age, and who had long ſuffered the diſeaſe, the abatement they procured of the gouty paroxyſms has been followed by ſymptoms more alarming.

The tops of the plant, gathered when the ſeeds are formed, are generally preferred to the leaves. Their doſe, in ſubſtance, dried and powdered, is from half a dram to a dram or more. They give out their virtues both to watery and ſpirituous menſtrua; and tinge the former of a yellowiſh colour, inclining more or leſs to brown, according to the degree of ſaturation; the latter of a deep green. Water ſeems to diſſolve the bitter matter more perfectly than pure ſpirit; the watery extract being ſtronger in taſte than the ſpirituous, though the quantity of both extracts, according to Cartheuſer's experiments, is very nearly alike. *Lewis's Hiſtory of the Materia Medica.*

CHAMÆLEON, *Chamæleo*, in zoology, a ſpecies of lizard with a ſhort rounded tail, five toes on each foot, two or three of which adhere together. See LIZARD.

CHAMÆMELUM, camomile, in botany, a plant with finely divided leaves; and moderately large flowers, ſtanding ſolitary on the tops of the ſtalks, upon long naked pedicles: the flower is compoſed of a number of white petala, ſet round a yellow convex diſk.

The leaves and flowers of this plant have a ſtrong, not ungrateful ſmell; and a very bitter nauſeous taſte. The flowers are ſomewhat bitterer, and conſiderably more aromatic than the leaves; and the yellow diſk of the flower is, in both reſpects, far ſtronger than the white petala. The ſmell, as well as the taſte, is rather improved than weakened by drying, and does not ſoon ſuffer any conſiderable diminution in keeping.

This plant, beſides its general virtues as a bitter, is ſuppoſed to have ſome degree of a carminative, anodyne, and antiſpaſmodic power, depending on its odorous matter. It is recommended in cholics of different kinds, particularly ſuch as ariſe from flatulencies or cold; in hyſterical and hypochondriacal diſorders, and ſpaſmodic and nephritic pains; in the pains of child-bed women, and deficiencies of the uterine purgations; and intermitting fevers, where a viſcidity of the humours, or obſtructions of the viſcera, render the Peruvian bark ineffectual or prejudicial. In this laſt intention, the camomile is generally aſſiſted by fixed alkaline ſalts, ſal-ammoniac, or rather aperients, and often alſo by corroborating materials. Baglivi's preparation of camomile, which he looks upon as the moſt certain ſpecific in obſtinate intermittents, was probably rather a compoſition of this kind, than any particular preparation of the camomile alone. The doſe of the dry flowers, in ſubſtance, is from ten or twelve grains to half a dram or more; in decoction or infuſion, two drams.

The leaves and flowers are frequently employed externally, in diſcutient and antiſeptic fomentations, and in emollient and carminative glyſters. They appear, from Dr. Pringle's experiments, to ſtand very high in the ſcale of antiſeptics; the ſoluble part of the flowers reſiſting the putrefaction of animal fleſh, with a power at leaſt of one hundred and twenty times greater than ſea-ſalt. Some endeavour to impregnate oil olive with the active matter of the camomile, for external uſes, by gently boiling the freſh herb and flowers bruiſed, in thrice their quantity of the oil, till they become criſp; and then ſtraining and preſſing out the fluid. A preparation of this kind might be obtained, perhaps, to better purpoſe, by a proceſs ſimilar to that, whereby expreſſed oils are perfumed with the fragrance of the more odoriferous flowers; for the ſtrong heat, neceſſary for making the fluid boil, impreſſes a diſagreeable taint, and diſſipates the greateſt part of the volatile matter of the camomile.

CHAMÆPITYS, ground-pine, in botany, a low, hairy, creeping plant, with ſquare ſtalks; whitiſh clammy leaves, cut deeply into three long narrow ſegments, like thoſe of the pine-tree, ſet in pairs at the joints; and yellow labiated flowers, without pedicles, and wanting the upper lip. It is annual, grows wild in ſandy and chalky grounds in ſome parts of England, and flowers in July.

The leaves of ground-pine are moderately bitter, and of a reſinous, not diſagreeable ſmell; approaching in this reſpect, as in their external form, to thoſe of the pine-tree. They are recommended as aperients, and corroborants of the nervous ſyſtem; and ſaid to be particularly ſerviceable in female obſtructions, paralytic diſorders, and when continued for a length of time, either by themſelves or with the aſſiſtance of germander, in rheumatic, iſchiadic, and gouty pains.

The leaves in ſubſtance, dried and powdered, are directed to be given from half a dram to a dram. Their virtues are extracted both by water and ſpirit, moſt perfectly by the latter: the aqueous tinctures are yellowiſh, the ſpirituous green In diſtillation they weakly impregnate water with their reſinous ſcent: on diſtilling large quantities of the herb, a little eſſential oil may be collected, in quality ſomewhat approaching to that of turpentine. The watery extract joined to its bitterneſs a weak ſaline auſterity; the ſpirituous, a ſlight ſweetiſhneſs and warmth.

CHAMANIM, in Jewiſh antiquity, idols expoſed to the ſun upon tops of houſes, according to Rabbi Solomon: others will have the chamanim to be the ſame with what the Greeks call pyræa; that is, portable chapels, or temples, made in the form of chariots, in honour of the ſun. See the article PYRÆA.

CHAMBER, in building, any room ſituated between the lowermoſt and the uppermoſt rooms: in moſt houſes there are two, in others three, or more ſtories of chambers. Sir Henry Wooton directs that the principal chambers for delight be ſituated towards the eaſt. Palladio's rules for the height of chambers, anti-chambers, and halls, either flat or arched, are as follows. 1. If they be flat, he adviſes to divide the breadth into three parts, and to take two of them for the height of the ſtory from the floor to the joiſt. If the chamber is deſired higher, the breadth muſt be divided into ſeven, of which take five for the height. 2. The height of the ſecond ſtory ſhould be 1 $\frac{1}{6}$ leſs than that of the chamber below. 3. For an attic or third ſtory, the ſecond muſt be divided into twelve equal parts; nine of which will give the height from the floor to the bottom of the joiſts.

Bed CHAMBER, one with a bed in it. See the article BED.

Privy CHAMBER. Gentlemen of the privy chamber, are ſervants of the king, who wait and attend on him and the queen at court, in their diverſions, &c. Their number is forty-eight under the lord chamberlain, twelve of whom are in quarterly waiting, and two of theſe lie in the privy chamber.

In the abſence of the lord-chamberlain, or vice-chamberlain, they execute the king's orders: at coronations, two of them perſonate the dukes of Aquitain and Normandy: and ſix of them, appointed by the lord-chamberlain, attend ambaſſadors from crowned heads to their audiences, and in public entries. The gentlemen of the privy-chamber were inſtituted by Henry VII.

CHAMBER, in policy, the place where certain aſſemblies are held, alſo the aſſemblies themſelves. Of theſe, ſome are eſtabliſhed for the adminiſtration of juſtice, others for commercial affairs.

CHAMBER, in war, is ſaid to conſiſt of the three following. 1. Of a powder-chamber, or bomb-chamber, a place ſunk under ground for holding the powder, or bombs, where they may be out of danger, and ſecured from the rain. 2. Of the chamber of a mine, the place, moſt commonly of a cubical form, where the powder is confined. And 3. Of the chamber of a mortar, that part of the chace, much narrower than the reſt of the cylinder, where the powder lies. It is of different forms, ſometimes like a reverſed cone, ſometimes globular, with a neck for its communication with the cylinder, whence it is called a bottled chamber, but moſt commonly cylindrical, that being the form which is found by experience to carry the ball to the greateſt diſtance.

CHAMBERLAIN, an officer charged with the management and direction of a chamber. See CHAMBER.

There are almoſt as many kinds of chamberlains as chambers, the principal whereof are as follow.

Lord CHAMBERLAIN *of Great Britain*, the ſixth great officer of the crown, to whom belongs livery and lodging in the king's court; and there are certain fees due to him from each archbiſhop or biſhop, when they perform their homage to his majeſty; and from all peers at their creation, or doing their homage. At the coronation of every king, he is to have forty ells of crimſon velvet for his own robes. This officer, on the coronation-day, is to bring the king his ſhirt, coif, and wearing cloaths; and after the king is dreſſed, he claims his bed, and all the furniture of his chamber, for his fees: he alſo carries at the coronation, the coif, gloves, and linen to be uſed by the king, and the robes-royal and crown: he dreſſes and undreſſes the king on that day, waits on him before and after dinner, &c.

To this officer belongs the care of providing all things in the houſe of lords in the time of parliament; to him alſo belongs the government of the palace of Weſtminſter: he diſpoſes likewiſe of the ſword of ſtate, to be carried before the king, to what lord he pleaſes.

Lord CHAMBERLAIN *of the Houſhold*, an officer who has the overſight and direction of all officers belonging to the king's chambers, except the precinct of his majeſty's bed-chamber.

He has the overſight of the officers of the wardrobe at all the king's houſes, and of the removing wardrobes, or of beds, tents, revels, muſic, comedians, hunting, meſſengers, &c. retained in his majeſty's ſervice. He moreover has the overſight and direction of the ſerjeants at arms, of all phyſicians, apothecaries, ſurgeons, barbers, the king's chaplains, &c. and adminiſters the oath to all officers above ſtairs.

Other chamberlains are thoſe of the king's court of exchequer, of North Wales, of Cheſter, of the city of London, &c. in which caſes this officer is generally the receiver of all rents and revenues belonging to the place whereof he is chamberlain.

In the exchequer there are two chamberlains who keep a controulment of the pells of receipts and exitus, and have certain keys of the treaſury, records, &c.

CHAMBERLAIN *of London* keeps the city money, which is laid up in the chamber of London: he alſo preſides over the affairs of maſters and apprentices, and makes free of the city, &c.

His office laſts only a year, but the cuſtom uſually obtains to re-chooſe the ſame perſon, unleſs charged with any miſdemeanor in his office.

Vice-CHAMBERLAIN. See the article VICE-*Chamberlain.*

CHAMBRANLE, among builders, an ornament of ſtone or wood bordering the three ſides of doors, windows and chimnies. It is different according to the ſeveral orders, and conſiſts of three parts, viz. the top called the traverſe, and the two ſides, the aſcendants.

The chambranle of an ordinary door is frequently called the door-caſe, and that of a window, the window, the window-frame: this is generally when it is plain, and without mouldings.

CHAMFER, or CHAMFRET, in architecture, an ornament conſiſting of half a ſcotia, being a kind of a ſmall furrow or gutter on a column, called alſo ſcapus, ſtria, &c.

CHAMFERING, in architecture, a term uſed for the cutting the under edge of any thing aſlope or level.

CHAIMOIS, or CHARMOIS-GOAT, in zoology, the name of the rupin capra, a creature of the goat-kind, with erect and ſhort but-hooked horns.

It is from the ſkin of this animal that the chamois leather is made.

CHAMPAIN, or *Point* CHAMPAIN, in heraldry, a mark of diſhonour in the coat of arms of him who kills a priſoner of war, after he has cried quarter.

CHAMPARTY, or CHAMPERTY, in law, a contract made with either the plaintiff or defendant in any ſuit at law, for giving part of the land, debt, &c. ſued for, to the party who undertakes the proceſs at his own proper charges, provided he ſucceeds therein.

CHAMPION, a perſon who undertakes a combat in the place or quarrel of another; and ſometimes the word is uſed for him who fights in his own cauſe.

CHAMPION *of the King*, a perſon whoſe office it is, at the coronation of our kings, to ride armed into Weſtminſter-hall, while his majeſty is at dinner there, and, by the proclamation of a herald, make challenge to this effect, viz. "That if any man ſhall deny the king's "title to the crown, he is there ready to defend it in "ſingle combat, &c." Which done, his majeſty drinks to him, and ſends him a gilt cup, with a cover, full of wine, which the champion drinks, and has the cup for his fee.

CHANCE, in a general ſenſe, a term applied to events, not neceſſarily produced, as the natural effects of any proper foreknown cauſe.

We certainly mean no more in ſaying that a thing happened by chance, than that its cauſe is unknown to us: for chance itſelf is no natural agent or cauſe; it is incapable of producing any effect, and is no more than a creature of man's own making; for the things done in the corporeal world, are really done by the parts of the univerſal matter, acting and ſuffering, according to the laws of motion eſtabliſhed by the author of nature.

Chance is alſo confounded with fate and deſtiny.

CHANCE is more particularly uſed for the probability of an event, and is greater or leſs, according to the number of chances by which it may happen, compared with the number of chances by which it may either happen or fail. Thus, if an event has three chances to happen, and two to fail, the probability of its happening may be eſtimated $\frac{3}{5}$, and the probability of its failing $\frac{2}{5}$. Therefore if the probability of happening and failing be added together, the ſum will always be equal to unity.

If the probabilities of happening and failing are unequal, there is what is commonly called odds for or againſt the happening or failing, which odds are proportional to the number of chances for happening or failing.

The expectation of obtaining any thing is eſtimated by the value of that thing, multiplied by the probability of obtaining it. The riſk of loſing any thing is eſtimated by the value of that thing, multiplied by the probability of loſing it. If from the expectations which the gameſters have upon the whole ſum depoſited, the particular ſums they depoſite; that is, their own ſtakes be ſubtracted, there will remain the gain, if the difference is poſitive; or the loſs, if the difference is negative. Again, if from the reſpective expectations which either gameſter has upon the ſum depoſited by his adverſary, the riſk of loſing what he himſelf depoſites be ſubtracted, there will likewiſe remain his gain or loſs.

If there is a certain number of chances by which the poſſeſſion of a ſum can be ſecured, and alſo a certain number of chances by which it may be loſt, that ſum may be inſured for that part of it, which ſhall be to the whole; as the number of chances there is to loſe it, is to the number of all the chances. For the manner of applying the doctrine of chances to gaming and annuities, ſee GAMING and INTEREST.

CHANCE-MEDLEY, in law, is the accidental killing of a man, not altogether without the killer's fault, tho' without any evil intention; and is where one is doing a lawful act, and a perſon is killed thereby: for if the act be unlawful, it is felony.

The difference betwixt chance-medley and manſlaughter is this: if a perſon caſt a ſtone, which happens to hit one, and he dies; or if a workman, in throwing down rubbiſh from a houſe, after warning to take care, kill a perſon, it is chance-medley and miſadventure: but if a perſon throws ſtones on the highway, where people uſually paſs; or a workman throws down rubbiſh from a houſe in cities and towns where people are continually paſſing; or if a man whips his horſe in the ſtreet, to make him gallop, and the horſe runs over a child and kills it, it is man-ſlaughter: but if another whips the horſe, it is man-ſlaughter in him, and chance-medley in the rider. In chance-medley the offender forfeits his goods, but has a pardon of courſe.

CHANCEL, a particular part of the fabric of a Chriſtian church; or that part of the choir between the altar and the baluſtrade that incloſes it, where the miniſter is placed at the celebration of the communion.

CHANCEL, among us, is alſo the rector's freehold and part of his glebe, and therefore he is obliged to repair it; but where the rectory is impropriate, the impropriator muſt do it.

CHANCELLOR, an officer ſuppoſed originally to have been a notary or ſcribe under the emperors, and named *cancellarius*, becauſe he ſat behind a lattice, called, in Latin, *cancellus*, to avoid being crowded by the people.

According to a late treatiſe, the chancellor originally preſided over a political college of ſecretaries, for the writing of treaties, and other public buſineſs; and the court of equity, under the old conſtitution, was held before the king and his council, in the palace, where one ſupreme court for buſineſs of every kind was kept. At firſt the chancellor became a judge, to hear and determine petitions to the king, which were preferred to him; and in the end, as buſineſs increaſed, the people addreſſed their ſuit to the chancellor, and not to the king; and thus the chancellor's equitable power, by degrees, commenced by preſcription.

Lord High **CHANCELLOR** *of Great Britain*, or *Lord Keeper of the Great Seal*, is the higheſt honour of the long robe, being made ſo *per traditionem magni ſigilli, per dominum regem*, and by taking the oaths: he is the firſt perſon of the realm next after the king and princes of the blood, in all civil affairs; and is the chief adminiſtrator of juſtice next to the ſovereign, being the judge of the court of chancery.

All other juſtices are tied to the ſtrict rules of the law in their judgment: but the chancellor is inveſted with the king's abſolute power, to moderate the written law, governing his judgment purely by the law of nature and conſcience, and ordering all things according to equity and juſtice. In this reſpect Staunford ſays, the chancellor has two powers, one abſolute, the other ordinary: meaning, that although by his ordinary power, in ſome caſes, he muſt obſerve the forms of proceedings, as other inferior judges; yet in his abſolute power, he is not limited by the law, but by conſcience and equity.

The lord-chancellor not only keeps the king's great-ſeal, but alſo all patents, commiſſions, warrants, &c. from the king, are, before they are ſigned, peruſed by him: he has the diſpoſition of all eccleſiaſtical benefices in the gift of the crown, under twenty pound a year, in his majeſty's books; and he is ſpeaker of the houſe of lords. See the article PARLIAMENT.

CHANCELLOR *of a Cathedral*, an officer that hears leſſons and lectures read in the church, either by himſelf or his vicar; to correct and ſet right the reader when he reads amiſs; to inſpect ſchools; to hear cauſes; apply the ſeal, write and diſpatch the letters of the chapter; keep the books; take care that there be frequent preachings, both in the church and out of it; and aſſign the office of preaching to whom he pleaſes.

CHANCELLOR *of a Dioceſe*, a lay officer under a biſhop, who is judge of his court. See the article BISHOP's-*Court*.

CHANCELLOR *of the Dutchy of Lancaſter*, an officer appointed chiefly to determine controverſies between the king and his tenants of the dutchy-land, and otherwiſe to direct all his majeſty's affairs belonging to that court. See DUTCHY-*Court*.

CHANCELLOR *of the Exchequer*, an officer who preſides in that court, and takes care of the intereſt of the crown.

He is always in commiſſion with the lord-treaſurer for the letting of crown-lands, &c. and has power, with others, to compound for forfeitures of lands, upon penal ſtatutes: he has alſo great authority in managing the royal revenues, and in matters relating to the firſt fruits.

CHANCELLOR *of the Order of the Garter, and other military Orders*, is an officer who ſeals the commiſſions and mandates of the chapter and aſſembly of the knights, keeps the regiſter of their proceedings, and delivers acts thereof under the ſeal of their order.

CHANCELLOR *of an Univerſity* is he who ſeals the diplomas, or letters of degrees, proviſion, &c. given in the univerſity.

The chancellor of Oxford is uſually one of the prime nobility, choſen by the ſtudents themſelves in convocation. He is their chief magiſtrate; his office is *durante vita*, to govern the univerſity, preſerve and defend its rights and privileges, convoke aſſemblies, and do juſtice among the members under his juriſdiction.

Under the chancellor is the vice-chancellor, who is choſen annually, being nominated by the chancellor, and elected by the univerſity in convocation: he is always the head of ſome college, and in holy orders. His proper office is to execute the chancellor's power, to govern the univerſity according to her ſtatutes, to ſee that officers and ſtudents do their duty, that courts be duly called, &c. When he enters upon his office, he chooſes four pro-vice-chancellors out of the heads of the colleges, to execute his power in his abſence.

The chancellor of Cambridge is alſo uſually one of the prime nobility, and in moſt reſpects the ſame as that at Oxford, only he does not hold his office *durante vita*, but may be elected every three years. Under the chancellor there is a commiſſary, who holds a court of record for all privileged perſons and ſcholars under the degree of maſter of arts, where all cauſes are tried and determined by the civil and ſtatute-law, and by the cuſtom of the univerſity.

The vice-chancellor of Cambridge is choſen annually, by the ſenate, out of two perſons nominated by the heads of the ſeveral colleges and halls.

CHANCERY, the grand court of equity and conſcience, inſtituted to moderate the rigour of the other courts that are bound to the ſtrict letter of the law.

The juriſdiction of this court is of two kinds, ordinary or legal, and extraordinary or abſolute. The ordinary juriſdiction is that wherein the lord-chancellor, who is judge of this court, in his proceedings and judgment, is bound to obſerve the order and method of the common law; in ſuch caſes the proceedings, which were formerly in Latin, but now in Engliſh, are filed or enrolled in the petty-bag-office; and the extraordinary, or unlimited power, is that juriſdiction which the court exerciſes in caſes of equity, wherein relief is to be had by bill and anſwer.

The ordinary court holds plea of recognizances acknowledged in the chancery, writs of *ſcire facias*, for repeal of the king's letters patent, &c. alſo of all perſonal actions, by or againſt any officer of the court, and of ſeveral offences and cauſes by act of parliament; all original writs, commiſſions of bankrupts, of charitable uſes, of ideots, lunacy, &c. are iſſued hence.

The extraordinary court gives relief for and againſt infants, notwithſtanding their minority; for and againſt married women, notwithſtanding their coverture. All frauds and deceits, for which there is no redreſs at common law, all breaches of truſt, confidences and accidents, as to relieve obligers, mortgagers, &c. againſt penalties and forfeitures, where the intention was to pay the debt, are here remedied. But in all caſes where the plaintiff can have his remedy at law, he ought not to be relieved in chancery; and a thing which may be tried by a jury, is not triable in this court.

The court of chancery will not retain a ſuit for any thing under ten pounds value, except in caſes of charity, nor for lands, &c. under forty ſhillings per ann. In this court all patents, moſt ſorts of commiſſions, deeds between parties touching lands and eſtates, treaties with foreign princes, &c. are ſealed and enrolled. Out of it are iſſued writs to convene the parliament and convocation, proclamations, and charters, &c. For the ſeveral officers belonging to the court of chancery, ſee the articles MASTER *of the Rolls*, MASTERS *in Chancery*, CLERK, *&c.*

Apoſtolic **CHANCERY**, a court in the church of Rome, belonging to the pope.

The pope's datory and chancery courts were formerly one and the ſame thing; but the multitude of affairs to be tranſacted therein, obliged him to divide it into two tribunals, which are ſo nearly related to one another, that the chancery does no more than diſpatch all that has paſſed through the datory court. See the article DATORY *Court*.

The officers belonging to this court, are the regent, prelates, and regiſters. There are alſo ſix maſters in chancery, whoſe buſineſs it is to collect the bulls: each of theſe employments is purchaſed for ſix thouſand crowns. Theſe are ſubordinate to the maſter of the rolls, who keeps the regiſters of the bulls.

CHANCRE, in ſurgery. See the articles SHANKER and ULCER.

CHANDELIER, in fortification, a kind of moveable parapet, conſiſting of a wooden frame, made of two upright ſtakes, about ſix feet high, with croſs planks between them; ſerving to ſupport faſcines to cover the pioniers.

The chandeliers differ from blinds only in this, that the former cover the men only before, whereas the latter cover them alſo above.

They are uſed in approaches, galleries, and mines, to hinder the workmen from being driven from their ſtations.

CHANFRIN, in the manege, the fore-part of a horſe's head, extending from under the ears along the interval between the eye-brows down to his noſe.

CHANGE, in the manege. To change a horſe, or change hand, is to turn or bear the horſe's head from one hand to the other, from the right to the left, or from the left to the right.

You ſhould never change your horſe without puſhing him forward upon the turn, and after the turn, puſh him on ſtraight, in order to a ſtop.

CHANGE *of Seed*, in huſbandry, the ſowing a field or ſpot of ground firſt with one kind of ſeed, then another, and then a third kind.

This practice, however univerſal, and perhaps neceſſary in the common method of huſbandry, is nevertheleſs ſuperſeded or rendered uſeleſs by the new method, called horſe-hoeing huſbandry. See the article HORSE-HOEING.

CHANGES *of Inſects*, among zoologiſts. See the article TRANSFORMATION.

CHANGES *of Quantities, Numbers, &c.* in arithmetic, the ſame with what is otherwiſe called permutation. See the article PERMUTATION.

CHANGE, or EXCHANGE, in matters of commerce. See the article EXCHANGE.

CHANNEL, in architecture, that part of the Ionic capital which is under the abacus, and lies open upon the echinus or eggs, which has the centers or turnings on every ſide to make the volutes.

CHANNEL *of the Volute*, in the Ionic capital, the face of the circumvolution incloſed by a liſtel.

CHANNEL, in geography, an arm of the ſea, or a narrow ſea between two continents, or between a continent and an iſland. Such are the Britiſh channel, St. George's channel, the channel of Conſtantinople, &c.

CHANNEL *of a River*, the bed of a river. See the article RIVER.

CHANNEL, in hydrography, the deepeſt part of a river, harbour, or ſtreight, which is rendered the moſt convenient for the track of ſhipping.

CHANNEL, in naval architecture, a broad thick plank, placed edgeways on a ſhip's ſide, abreaſt of all the maſts: they are uſed to extend the ſhroud by which the maſt is ſecured to a proper width. See the article CHAINS.

CHANNEL *of the Mouth of a Horſe*, that concavity in the middle of the lower jaw, appointed for a place to the tongue; which being bounded on each ſide by the bars, terminates in the grinders. It ſhould be large enough not to be preſſed with the bit mouth.

CHANTLATE, in building, a piece of wood faſtened near the ends of the rafters, and projecting beyond the wall to ſupport two or three rows of tiles, ſo placed as to prevent the rain water from tickling down the ſides of the walls.

CHANTOR, a ſinger in the choir of a cathedral. The word is almoſt grown obſolete, choriſter or ſinging-man being commonly uſed inſtead of it.

CHANTOR is uſed by way of excellence for the precentor or maſter of the choir, which is one of the firſt dignities of the chapter.

CHANTRY, or CHAUNTRY, a church or chapel endowed with lands, &c. for the maintenance of one or more prieſts to ſay maſs for the ſouls of the donors. Hence,

CHANTRY-RENTS, are rents ſtill paid to the crown by the purchaſers of thoſe lands.

CHAOLOGY, denotes the hiſtory or deſcription of the chaos.

CHAOS, that confuſion in which matter lay when newly produced out of nothing at the beginning of the world, before God, by his Almighty word, had put it into the order and condition wherein it was after the ſix days creation.

The philoſophers, poets, and prieſts of antiquity among the heathens, embraced this opinion. Chaos, according to them, was the moſt ancient of all beings, the eternal Being, the firſt principle and cradle of the univerſe. The Barbarians, Egyptians, and Perſians, agree in this notion: Ariſtophanes, Euripides, &c. the Ionic and Platonic philoſophers, even the Stoics, ſet out with a chaos, and look on the ſucceſſive periods and revolutions of this chaos, to have continued according to the laws of motion, till, by different combinations, it at laſt formed the univerſe in that order we at preſent ſee it.

Among the Romans, Ennius, Varro, Ovid, Lucretius, Statius, &c. held the ſame opinion. This took its riſe among the Barbarians, by whom it was tranſmitted to the Greeks, from them deſcended to the Romans, and was propagated to other nations: ſo that it ſeems doubtful to determine whether this doctrine be more ancient than univerſal.

Though the firſt notion of a chaos be very ancient, it is very difficult to determine whom we ought to aſcribe its origin to. Moſes, the moſt ancient of all writers, in his hiſtory of the Creation, deſcribes the world before to have been an undigeſted heap, wherein all the elements were confuſed: and from hence, probably, the Barbarian and Greek philoſophers borrowed the notion of their chaos. Moſes tells us this maſs was covered with water; and ſeveral of the ancient philoſophers have aſſerted the chaos was a maſs of water, not elementary water, nor ocean, but a kind of mud, the fermentation of which, in time, produced this world.

Cudworth, Grotius, Schmid, Dickinſon, and others, confirm this aſſertion, by inſiſting on the analogy there is between what Moſes relates of the ſpirit of God moving upon the face of the waters, and the fondneſs of the mythologiſts to ſeparate the chaos: they add farther in ſupport of this, that a very ancient opinion prevailed, both among the philoſophers and mythologiſts, that there is a ſpirit in the waters, *aqua per ſpiritum movetur:* from whence they conclude, that the ancient philoſophers originally had their opinion and notion of a chaos from the works of Moſes, which they afterwards altered to their own convenience or pleaſure.

Whatever was the opinion of the ancients concerning the chaos and its origin, it is certain Moſes included all things in the womb of his chaos: and that their ſeparation, conducted by an Almighty hand, ſoon brought forth all this variety of creatures which embelliſh the univerſe. To imagine, after the example of ſome ſyſtem-writers, that God at firſt produced only a vague and undetermined matter, out of which motion, by inteſtine fermentations and attractions, formed a ſun, an earth, and all the ornaments of the univerſe; to ſuppoſe, with Whiſton, that the ancient chaos was the atmoſphere of a comet; that there is a conformity between the earth and the comets, which demonſtrates that a planet is nothing but a comet, which has acquired and aſſumed a regular and durable form, has placed itſelf at a proper diſtance from the ſun, and turns round it in an orbit, nearly circular; and that a comet is nothing but a planet, which begins to deſtroy or form itſelf again, that is, a chaos which, in its primordial ſtate, moves in an orbit very excentric: to ſupport theſe and many other extravagancies which have been advanced, the enumeration of them would take up time impertinently, and be ſubſtituting opinions that want veriſimilitude, in the room of thoſe truths which God has atteſted by the mouth of Moſes. According to the ſacred account, water was already made; then he tells us the ſpirit of God moved upon the face of the waters, the ſtars of the heaven, as well as our earth, were already made, becauſe the heaven which contains them were already created. This philoſophy of Moſes, which repreſents eternal wiſdom regulating nature by an expreſs will and command, proceeds on certain uniform and general laws, is undoubtedly more rational than any whimſical ſyſtems that have been propoſed by the ancient materialiſts, who form the world from a fortuitous concourſe of atoms; or ſome modern philoſophers, who would account for the exiſtence of all beings, on the principle of homogeneous particles aſſembling themſelves together. Thoſe latter ſeem not to reflect, that by attributing the formation of all particular beings, the harmony, connection, and dependence apparent between them, to the impetus of a blind motion, they rob the Almighty of his greateſt glory, the fabric of the univerſe, in favour of a cauſe they are ignorant of, both with regard to itſelf, and the manner of its operation. This doctrine borders cloſely on the errors and abſurdities of Strato and Spinoza.

From what we have ſaid, the little certainty of philoſophy, both in its principles and progreſs, is obvious: it has aſſerted at one time that motion and matter only were neceſſary beings; if it has perſiſted in maintaining matter to be uncreated, yet it has ſubmitted that matter to the direction of an intelligent being, to make it aſſume a thouſand different forms, and diſpoſe its parts in that fitneſs and order which was neceſſary to produce the univerſe. The preſent opinion is, that matter was created, and that God gave it motion; that this motion, firſt impreſſed by the hand of God, is ſufficient of itſelf to produce all the phænomena we obſerve in the viſible world. A philoſopher, who ſhould be hardy enough to explain the mechaniſm, and even the firſt formation of things, barely by the laws of motion, and ſay, Give me matter and motion, and I will make a world, ought firſt to demonſtrate, that exiſtence and motion are not eſſential to matter; for without this precaution, this philoſopher, ſeeing nothing in the wonderful works which nature has produced, but what motion only might have effected, will be apt to fall into atheiſm.

Let us open our eyes then on the dangerous enthuſiaſm of forming ſyſtems, and believe with Moſes, that, when God created matter, the heaven and the earth out of nothing, he determined, by ſo many particular acts of his will, all the different materials, which in the courſe of the following operations ſerved for the formation of the world. In the laſt five days of the creation, God only diſpoſed every being in the place he had deſtined for it, to form the ſplendid picture of the univerſe. That before the fiat was a confuſed maſs, and the ſcene of the world opened, as the Almighty voice of its creator ranged the different beings in that wonderful order which conſtitutes its preſent beauty.

Far from being of opinion that this notion of a chaos was particular to Moſes, all nations, barbarous or civilized, ſeem to have preſerved one common tradition of a ſtate of darkneſs and confuſion prior to the creation of the world; and it is probable they imbibed this notion from the ſame common ſource, notwithſtanding the ignorance of the people, and the fictions of the poets, have ſo much diſguiſed it.

CHAPE, among ſcabbard-makers, denotes the metalline plate fixed on the end of a ſcabbard, to prevent the point of the ſword from piercing through it.

Chape, among ſportſmen, ſignifies the tip of a fox's bruſh.

CHAPEAU, in heraldry, an ancient cap of dignity worn by dukes, being ſcarlet-coloured velvet on the outſide, and lined with a fur.

It is frequently borne above an helmet inſtead of a wreath, under gentlemen's creſts.

CHAPEL, or Chappel, a place of divine worſhip, ſerved by an incumbent under the denomination of a chaplain.

Chapel is alſo a name given to a printer's work-houſe, in which ſenſe they ſay, the laws of the chapel, the ſecrets of the chapel.

Knights of the Chapel, called alſo poor knights of Windſor, were inſtituted by Henry VIII. in his teſtament. Their number was at firſt thirteen, but has been ſince augmented to twenty-ſix. They aſſiſt in the funeral ſervices of the kings of England: they are ſubject to the office of the canons of Windſor, and live on penſions aſſigned them by the order of the garter. They bear a blue or red cloak, with the arms of St. George on the left ſhoulder.

CHAPELET, in the manege, a couple of ſtirrup-leathers, mounted each of them with a ſtirrup, and joined at top in a ſort of leather buckle, called the head of the chapelet, by which they are made faſt to the pummel of the ſaddle, after being adjuſted to the rider's length and bore. They are uſed both to avoid the trouble of taking up or letting down the ſtirrups, every time that the gentleman mounts on a different horſe and ſaddle, and to ſupply the place of the academy ſaddles, which have no ſtirrups to them.

CHAPERON, a covering for the head, formerly worn both by men and women. Hence it became the name of thoſe little ſhields, containing death's heads, and other funeral devices, placed upon the foreheads of horſes that drew hearſes at pompous funerals.

Chaperon *of a Bit Mouth*, ſignifies the end of the bit that joins to the branch juſt by the banquet. In ſcatch mouths the chaperon is round, in others it is oval.

CHAPITERS, in architecture, the ſame with capitals. See the article Capital.

Chapiters, in law, formerly ſignified a ſummary of ſuch matters as were enquired of, or preſented before juſtices in eyre, juſtices of aſſize or of the peace, in their ſeſſions.

Chapiters, at this time, denote ſuch articles as are delivered by the mouth of the juſtice in his charge to the inqueſt.

CHAPLAIN, an eccleſiaſtic who officiates in a chapel.

CHAPLET, a ſtring of beads uſed by the Roman catholics to count the number of their prayers. The invention of it is aſcribed to Peter the hermit, who probably learned it of the Turks, as they owe it to the Eaſt-Indians.

Chaplet, in architecture, a ſmall ornament carved into round beads, pearls, olives, and pater-noſters, as is frequently done in baguettes.

CHAPPE, in heraldry, the dividing an eſcutcheon by lines drawn from the center of the upper edge to the angles below, into three parts, the ſections on the ſides being of a different metal or colour from the reſt.

CHAPTER, *Capitulum*, in eccleſiaſtical policy, a ſociety or community of clergymen belonging to cathedrals and collegiate churches.

Chapter is alſo applied to aſſemblies held by religious and military orders for regulating their affairs, and alſo to the hall where ſuch aſſemblies are convoked. In monaſteries, the chapter is uſually in the middle of the cloiſters.

Chapter, in matters of literature, a diviſion in a book for keeping the ſubject treated of more clear and diſtinct. St. Auguſtine compares them to inns, inaſmuch as they refreſh the reader, as the other the traveller.

The Three Chapters, a famous phraſe in eccleſiaſtical hiſtory, ſignifying a volume written by Theodoret, an adherent of Neſtorius, againſt St. Cyril.

CHAPTREL, in architecture, the ſame with impoſt. See the article Impost.

CHARA, in botany, a genus of plants, without either flower-petals, or pericarpium, having a ſingle ovato-oblong ſeed. Vaillant diſtinguiſhes nine ſpecies of the charas, but there are no medicinal virtues aſcribed to any of them.

CHARABE, or Carabe, names ſometimes uſed for the juice of the poplar-tree, as alſo for amber. See the articles Poplar-Tree and Amber.

CHARACTER, χαρακτηρ, in a general ſenſe, denotes any mark whatever, ſerving to repreſent either things or ideas: thus, letters are characters, types, or marks of certain ſounds; words, of ideas, &c. See the article Letter, &c.

Characters are of infinite advantage in almoſt all ſciences, for conveying, in the moſt conciſe and expreſſive manner, an author's meaning: however, ſuch a multiplicity of them, as we find uſed by different nations, muſt be allowed to be a very conſiderable obſtacle to the improvement of knowledge; ſeveral authors have therefore attempted to eſtabliſh characters that ſhould be univerſal, and which each nation might read in their own language, and conſequently, which ſhould be real, not nominal or arbitrary, but expreſſive of things themſelves; thus, the univerſal character for a horſe would be read by an Engliſhman, *horſe*; by a Frenchman, *cheval*; by the Latins, *equus*; by the Greeks, ιππος, &c.

The firſt who made any attempts for an univerſal character in Europe, were biſhop Wilkins and Dalgarme. Mr. Leibnitz alſo turned his thoughts that way; and Mr. Lodwic, in the Philoſophical Tranſactions, gives a plan of an univerſal character, which was to contain an enumeration of all ſingle ſounds as are uſed in any language. The advantages he propoſed to derive from this character were, that people would be enabled to pronounce truly and readily any language that ſhould be pronounced in their hearing; and laſtly, that this character would ſerve as a ſtandard to perpetuate the ſounds of every language whatſoever.

In the Journal Literaire of 1720, there is a project for an univerſal character, by means of the common Arabic or numeral figures: the combinations of theſe nine, ſays the author, is ſufficient to expreſs diſtinctly, an incredible quantity of numbers, much more than we ſhall need terms to ſignify our actions, goods, evils, duties, paſſions, &c. and the Arabic figures having already all the univerſality required, the trouble is already ſaved of framing and learning any new character. But here the difficulty is not ſo great to invent the moſt ſimple, eaſy, and convenient characters, as to engage different nations to uſe theſe characters.

Literal characters may be divided, with reſpect to the nations among whom they have been invented, into Greek characters, Hebrew characters, &c. The Latin character, now uſed through all Europe, was formed from the Greek, as the Greek was from the Phœnician, and the Phœnician, as well as the Chaldee, Syriac, and Arabic characters, were formed from the ancient Hebrew, which ſubſiſted till the Babyloniſh captivity; for after that event, the character of the Aſſyrians, which is the ſquare Hebrew now in uſe, prevailed, the ancient being only found on ſome Hebrew medals, commonly called Samaritan medals. It was in 1091 that the Gothic characters, invented by Ulfilas, were aboliſhed, and the Latin ones eſtabliſhed in their room.

Medalliſts obſerve, that the Greek character, conſiſting only of majuſcule letters, has preſerved its uniformity on all medals, as low as the time of Gallienus; from that time it appears ſomewhat weaker and rounder: from the time of Conſtantine to Michael, we find only Latin characters; and after Michael the Greek characters recommence; but from that time they begin to alter with the language, which was a mixture of Greek and Latin. The Latin medals preſerve both their character and language as low as the tranſlation of the ſeat of the empire to Conſtantinople: towards the time of Decius the character began to loſe its roundneſs and beauty; ſome time after it retrieved, and ſubſiſted tolerably till the time of Juſtin, when it degenerated gradually into the Gothic. The rounder, then, and better formed a character is, upon a medal, the fairer pretence it has to antiquity.

Character is alſo uſed, in ſeveral of the arts, for a ſymbol, contrived for the more conciſe and immediate conveyance of the knowledge of things. We ſhall here ſubjoin the principal of them.

Characters *in Algebra*. The firſt letters of the alphabet, as a, b, c, d, *&c.* are generally the characters of the given quantities; and the laſt letters, as x, y, z, *&c* the characters of the quantities ſought. Some however uſe the conſonants to repreſent the known, and the vowels to repreſent the unknown quantities.

m, n, r, s, t, *&c.* are the characters of indeterminate exponents, whether ratios or powers. Thus x^m, y^n, z^r, *&c.* imply undetermined powers of different kinds; mx, ny, rz, different multiples, or ſubmultiples, of the quantities x, y, z, according as m, n, r, are either whole numbers or fractions.

+ *plus*, or *more*, is the ſign of real exiſtence of the quantity it ſtands before, and is called an affirmative or poſitive ſign. It is alſo the mark of addition: thus $a+b$, or $6+9$, implies that a is to be added to b, or 6 added to 9.

− *minus*, or *leſs*, before a ſingle quantity, is the ſign of negation or negative exiſtence, ſhewing the quantity to which it is prefixed to be leſs than nothing. But between quantities it is the ſign of ſubtraction; thus, $a-b$, or $8-4$, implies b ſubtracted from a, or 8 after 4 has been ſubtracted.

= *equal*. The ſign of equality, though Des Cartes and ſome others uſe this mark ∞; thus, $a=b$ ſignifies that a is equal to b. Wolfius and ſome others uſe the mark ≐ for the identity of ratios.

× *into*, or *with*. The ſign of multiplication, ſhewing that the quantities on each ſide the ſame are to be multiplied by one another, as $a \times b$ is to be read a multiplied into b; 4×8, the product of 4 multiplied into 8. Wolfius and others make the ſign of multiplication a dot between the two factors; thus, $5 \cdot 4$ ſignifies the product of 5 and 4. In algebra the ſign is commonly omitted, and the two quantities put together; thus, bd expreſſes the product of b and d. When one or both of the factors are compounded of ſeveral letters, they are diſtinguiſhed by a line drawn over them; thus, the factum of $a+b-c$ into d, is wrote $d \times \overline{a+b-c}$. Leibnitz, Wolfius, and others, diſtinguiſh the compound factors, by including them in a parentheſis thus $(a+b-c)\,d$.

÷ *by*. The ſign of diviſion; thus, $a \div b$ denotes the quantity a to be divided by b. In algebra the quotient is often expreſſed like a fraction, thus $\frac{a}{b}$ denotes the quotient of a divided by b. Wolfius makes the ſign of diviſion two dots; thus, $12:4$ denotes the quotient of 12 divided by $4=3$. If either the diviſor or dividend, or both, be compoſed of ſeveral letters; for example, $a+b \div c$, inſtead of writing the quotient like a fraction, $\frac{a+b}{c}$, Wolfius includes the compound quantities in a parentheſis, thus $(a+b):c$.

ɕ *involution*. The character of involution.

vr *evolution*. The character of evolution, or the extracting of roots.

> or ⊏ are ſigns of majority; thus, $a>b$ expreſſes that a is greater than b.

< or ⊐ are ſigns of minority; and when we would denote that a is leſs than b, we write $a<b$, or $a \sqsupset b$.

∽ is the character of ſimilitude uſed by Wolfius, Leibnitz, and others: it is uſed in other authors for the difference between two quantities, while it is unknown which is the greater of the two.

:: *ſo is*. The mark of geometrical proportion disjunct, and is uſually placed between two pair of equal ratios, as $3:6::4:8$, ſhews that 3 is to 6 as 4 is to 8.

∻ the mark of geometrical proportion continued, implies the ratio to be ſtill carried on without interruption, as 2, 4, 8, 16, 32, 64 ∻ are in the ſame uninterrupted proportion.

√ *irrationality*. The character of a ſurd root, and ſhews, according to the index of the power that is ſet over it, or after it, that the ſquare, cube, or other root is extracted, or to be extracted; thus, $\sqrt{16}$, or $\sqrt{}^2\,16$ or $\sqrt{}(2)\,16$, is the ſquare root of 16. $\sqrt[3]{25}$, the cube root of 25, &c.

This character ſometimes affects ſeveral quantities, diſtinguiſhed by a line drawn over them thus, $\sqrt{b+d}$ denotes the ſquare root of the ſum of b and d. When any term or terms of an equation are wanting, they are generally ſupplied by one or more aſteriſms: thus in the equation

$$\left.\begin{array}{l} y^2+py+\frac{1}{4}p^2+q \\ \quad -py-\frac{1}{2}p^2 \end{array}\right\} = 0,$$ the term $\pm py$ *vaniſhing*, is marked with an aſteriſm, as $y^2 * -\frac{1}{4}p^2+q$.

CHARACTERS *uſed in Aſtronomy.*

Characters of the planets.

♄	Saturn
♃	Jupiter
♂	Mars
☉	Sun
♀	Venus
☿	Mercury
☽	Moon
⊕	Earth

Of the ſigns.

♈	Aries
♉	Taurus
♊	Gemini
♋	Cancer
♌	Leo
♍	Virgo
♎	Libra
♏	Scorpio
♐	Sagittarius
♑	Capricornus
♒	Aquarius
♓	Piſces

Of the aſpects.

☌ or S	Conjunction
SS	Semiſextile
✱	Sextile
Q	Quintile
□	Quartile
Td	Tredecile
△	Trine
Bq	Biquintile
Vc	Quincunx
☍	Oppoſition
☊	Dragon's head
☋	Dragon's tail

Of time.

A. M. *ante meridiem*, before the ſun comes upon the meridian.

O. or N. noon.

P. M. *poſt meridiem*, when the ſun is paſt the meridian.

CHARACTERS *in Geometry and Trigonometry.*

∥	The character of parallеliſm
△	triangle
□	ſquare
▯ ▭	rectangle
⊙	circle.
≚	equiangular, or ſimilar
⊥̳	equilateral
<	an angle
∟	right angle
⊥	perpendicular

° denotes a degree; thus 45° implies 45 degrees. ′ a minute; thus, 50′, is 50 minutes. ″, ‴, ⁗, denote ſeconds, thirds, and fourths: and the ſame characters are uſed where the progreſſions are by tens, as it is here by ſixties.

CHARACTERS *uſed in the Arithmetic of Infinites.*

A dot over a letter is the character of an infiniteſimal or fluxion; thus, $\dot{x}$, $\dot{y}$, *&c.* expreſs the fluxions or differentials of the variable x and y; and two, three, or more dots denote ſecond, third, or higher fluxions. Mr. Leibnitz, inſtead of a dot, prefixes the letter d to the variable quantity, in order to avoid the confuſion of dots in the differencing of differentials. See the articles FLUXIONS and DIFFERENTIAL *Calculus.*

CHARACTERS *in Chemiſtry*; ſee plate VII.

CHARACTERS *in Grammar, Rhetoric, Poetry, &c.*

( )	parentheſis
[ ]	crotchet
-	hyphen
ʼ	apoſtrophe
ˊ	emphaſis or accent
˘	breve
¨	dialyſis
^	caret and circumflex
"	quotation
† ‡ and *	references
§	ſection or diviſion
¶	paragraph
F. R. S.	fellow of the royal ſociety.
SS. T. D.	doctor in divinity
V. D. M.	miniſter of the word of God
LL. D.	doctor of laws
J. V. D.	doctor of civil and canon law
M. D.	doctor in phyſic
A. M.	maſter of arts
A. B.	bachelor of arts

For the other characters uſed in grammar, ſee the articles COMMA, COLON, SEMICOLON, &c.

CHARACTERS *among the ancient Lawyers, and in ancient Inſcriptions.*

§	paragraphs
ff	digeſts
Scto	ſenatus conſulto
E.	extra
S. P. Q. R.	ſenatus populuſque Romanus
P. P.	pater patriæ
C.	code
C. C.	conſules
T.	titulus
P. P. D. D.	propria pecunia dedicavit
D. D. M.	dono dedit monumentum

CHARACTERS *in Medicine and Pharmacy.*

℞	recipe
ā, *āā*, or ana,	of each alike
℔	a pound or a pint
℥	an ounce
ʒ	a drachm
℈	a ſcruple
gr.	grains
ß or *ſs*,	half of any thing
cong.	congius, a gallon
coch.	cochleare, a ſpoonful
M.	manipulus, a handful
P.	a pugil
P. Æ.	equal quantities
S. A.	according to art
q. s.	a ſufficient quantity
q. pl.	as much as you pleaſe
P. P.	pulvis patrum, the jeſuit's bark

CHARACTERS uſed in muſic, and of muſical notes, with their proportions, are as follow.

𝆶	character of a large	8
𝆷	a long	4
𝅜	a breve	
𝅝	a ſemibreve	1
𝅗𝅥	minim	$\frac{1}{2}$
♩	crochet	$\frac{1}{4}$
♪	quaver	$\frac{1}{8}$
𝅘𝅥𝅯	ſemiquaver	$\frac{1}{16}$
𝅘𝅥𝅰	demiſemiquaver	$\frac{1}{32}$

♯ character of a ſharp note: this character at the beginning of a line, or ſpace, denotes that all the notes in that line are to be taken a ſemitone higher, than in the natural ſeries; and the ſame affects all the octaves above or below, though not marked: but when prefixed to any particular note, it ſhews that note alone to be taken a ſemitone higher than it would be without ſuch character.

♭ or *b*, character of a flat note: this is the contrary to the other above, that is, a ſemitone lower.

♮ character of a natural note: when in a line or ſeries of artificial notes, marked at the beginning ♭ or ♯, the natural note happens to be required, it is denoted by this character.

𝄞 character of the treble cliff.

𝄡 character of the mean cliff.

𝄢 baſs cliff.

$\frac{2}{4}$, or or $\frac{4}{8}$, characters of common duple time, ſignifying the meaſure of two crotchets to be equal to two notes, of which four make a ſemibreve.

C ¢ ↀ, characters that diſtinguiſh the movements of common time, the firſt implying ſlow, the ſecond quick, and the third very quick.

$\frac{3}{1}$, $\frac{3}{2}$, $\frac{3}{4}$, $\frac{3}{8}$, $\frac{3}{16}$, characters of ſimple triple time, the meaſure of which is equal to three ſemibreves, or to three minims.

$\frac{6}{4}$, or $\frac{6}{8}$, or $\frac{6}{16}$, characters of mixed triple time, where the meaſure is equal to ſix crochets or ſix quavers.

$\frac{9}{4}$, or $\frac{9}{8}$, or $\frac{9}{16}$, or $\frac{9}{1}$ or $\frac{9}{2}$, characters of compound triple time.

$\frac{12}{4}$, $\frac{12}{8}$, $\frac{12}{16}$, or $\frac{12}{1}$, or $\frac{12}{2}$, characters of that ſpecies of triple time called the meaſure of twelve times. See TRIPLE.

Numeral CHARACTERS, uſed to expreſs numbers, are either letters or figures.

The Arabic character, called alſo the common one, becauſe it is uſed almoſt throughout Europe in all ſorts of calculations, conſiſts of theſe ten digits, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.

The Roman numeral character conſiſts of ſeven majuſcule letters of the Roman alphabet, viz. I, V, X, L, C, D, M.

The I denotes one, V five, X ten, L fifty, C a hundred, D five hundred, and M a thouſand.

The I repeated twice makes two, II; thrice, three, III; four is expreſſed thus IV, as I before V or X takes an unit from the number expreſſed by theſe letters. To expreſs ſix an I is added to a V, VI; for ſeven, two, VII: and for eight, three, VIII: nine is expreſſed by an I before X, thus IX.

The ſame remark may be made of the X before L or C, except that the diminution is by tens; thus, XL denotes forty, XC ninety, and LX ſixty. The C before D or M diminiſhes each by a hundred.

The number five hundred is ſometimes expreſſed by an I before a C inverted, thus, IↃ; and inſtead of M, which ſignifies a thouſand, an I is ſometimes uſed between two C's, the one direct, and the other inverted, thus CIↃ. The addition of C and Ↄ before or after, raiſes CIↃ by tens, thus CCIↃↃ expreſſes ten thouſand, CCCIↃↃↃ, a hundred thouſand.

The Romans alſo expreſſed any number of thouſands by a line drawn over any numeral leſs than a thouſand; thus, $\overline{\mathrm{V}}$ denotes five thouſand, $\overline{\mathrm{LX}}$ ſixty thouſand: ſo likewiſe $\overline{\mathrm{M}}$ is one million, $\overline{\mathrm{MM}}$ is two millions, &c.

CHARACTER, in epic and dramatic poetry, that which is peculiar in the manners of any perſon, and diſtinguiſhes him from all others.

The poetical character, ſays Mr. Boſſu, is not properly any particular virtue or quality, but a compoſition of ſeveral which are mixed together, in a different degree, according to the neceſſity of the fable and the unity of the action: there muſt be one, however, to reign over all the reſt, and this muſt be found, in ſome degree, in every part. This firſt quality, in Achilles, is wrath; in Ulyſſes, diſſimulation; and in Æneas, mildneſs: but as theſe characters cannot be alone, they muſt be accompanied with others to embelliſh them, as far as they are capable, either by hiding their defects, as in the anger of Achilles, which is palliated by extraordinary valour; or by making them center in ſome ſolid virtue, as in Ulyſſes, whoſe diſſimulation makes a part of his prudence; and in Æneas, whoſe mildneſs is employed in a ſubmiſſion to the will of the gods. In the making up of which union, it is to be obſerved, the poets have joined together ſuch qualities as are by nature the moſt compatible; valour with anger, piety with mildneſs, and prudence with diſſimulation. The fable required prudence in Ulyſſes, and piety in Æneas; in this, therefore, the poets were not left to their choice: but Homer might have made Achilles a coward without abating any thing from the juſtneſs of his fable: ſo that it was the neceſſity of adorning his character that obliged him to make him valiant: the character, then, of a hero in the epic poem, is compounded of three ſorts of qualities; the firſt eſſential to the fable; the ſecond, embelliſhments of the firſt; and valour, which ſuſtains the other two, makes the third.

Unity of character is as neceſſary as the unity of the fable; for this purpoſe a perſon ſhould be the ſame from the beginning to the end: not that he is always to betray the ſame ſentiments, or one paſſion; but that he ſhould never ſpeak nor act inconſiſtently with his fundamental character. For inſtance, the weak may ſometimes ſally into a warmth, and the breaſt of the paſſionate be calm, a change which often introduces in the drama a very affecting variety; but if the natural diſpoſition of the former was to be repreſented as boiſterous, and that of the latter mild and ſoft, they would both act out of character, and contradict their perſons.

True characters are ſuch as we truly and really ſee in men, or may exiſt without any contradiction to nature: no man queſtions but there have been men as generous and as good as Æneas, as paſſionate and as violent as Achilles, as prudent and wiſe as Ulyſſes, as impious and atheiſtical as Mezentius, and as amorous and paſſionate as Dido; all theſe characters, therefore, are true, and nothing but juſt imitations of nature: on the contrary, a character is falſe when an author ſo feigns it that one can ſee nothing like it in the order of nature wherein he deſigns it ſhall ſtand; theſe characters ſhould be wholly excluded from a poem, becauſe, tranſgreſſing the bounds of probability and reaſon, they meet with no belief from the readers; they are fictions of the poet's brain, not imitations of nature; and yet all poetry conſiſts in an imitation of nature.

CHARACTER is alſo uſed by divines, eſpecially thoſe of the Romiſh church, for an indelible mark which the ſacraments of baptiſm, confirmation, and ordination, leave behind them in thoſe who receive them.

CHARACTERISTIC, in a general ſenſe, a peculiar mark or character whereby a perſon or thing is diſtinguiſhed from all others.

Grammarians uſe the term characteriſtic, in a more limited ſenſe, for the principal letter of a verb, preſerved through all its moods and tenſes, derivatives, and compounds: ſuch is the letter *w* in the word *brew*.

The characteriſtic letter is of moſt uſe in the formation of Greek verbs, as being always the ſame in the correſponding tenſes of the ſame conjugation, that is, in thoſe formed from the preſent, future, or preterit. See the articles VERB, MOOD, TENSE, &c.

CHARACTERISTIC *of a Logarithm*, the ſame with its index or exponent.

CHARACTERISTIC *of a Curve*, in the higher geometry, a rectilinear right-angled triangle, whoſe hypothenuſe makes a part of the curve not ſenſibly different from a right line.

It is ſo called becauſe curve lines are uſed to be diſtinguiſhed thereby.

CHARAG, the tribute which the Chriſtians and Jews pay to the Grand Signior.

CHARBON, in the manege, that little black ſpot or mark which remains after a large ſpot in the cavity of the corner teeth of a horſe: about the ſeventh or eighth year, when the cavity fills up, the tooth being ſmooth and equal, it is ſaid to be raiſed.

CHARCOAL, a ſort of fuel conſiſting of wood chared or half burnt.

There are conſiderable differences in the coals of different vegetables, in regard to their habitude to fire: the very light coals of linen, cotton, ſome fungi, &c. readily catch fire from a ſpark, and ſoon burn out; the more denſe ones of woods and roots are ſet on fire more difficultly, and burn more ſlowly: the coals of the blackberry-bearing alder, of the hazel, the willow, and the lime-tree, are ſaid to anſwer beſt for the making of gunpowder and other pyrotechnical compoſitions, perhaps from their being eaſily inflammable: for the reduction of metallic calces thoſe of the heavier woods, as the oak and the beech, are preferable, theſe ſeeming to contain a larger proportion of the phlogiſtic principle, and that, perhaps, in a more fixed ſtate; conſidered as common fuel, thoſe of the heavy woods give the greateſt heat, and require the moſt plentiful ſupply of air to keep them burning; thoſe of the light woods preſerve a glowing heat, without much draught of air, till the coals themſelves are conſumed; the bark commonly crackles and flies about in burning, which the coal of the wood itſelf very ſeldom does.

Charcoal, in burning, is ſuppoſed to emit a peculiar vapour, which confined, and accumulated in a cloſe room, proves poiſonous to animals: there are, indeed, too many examples of fatal conſequences from the burning of charcoal in cloſe places; not, however, from the charcoal giving out any pernicious matter, but from the quality of the air of the room being altered by the fire: air that has paſſed through burning fuel is no longer capable of ſupporting either fire or the life of animals.

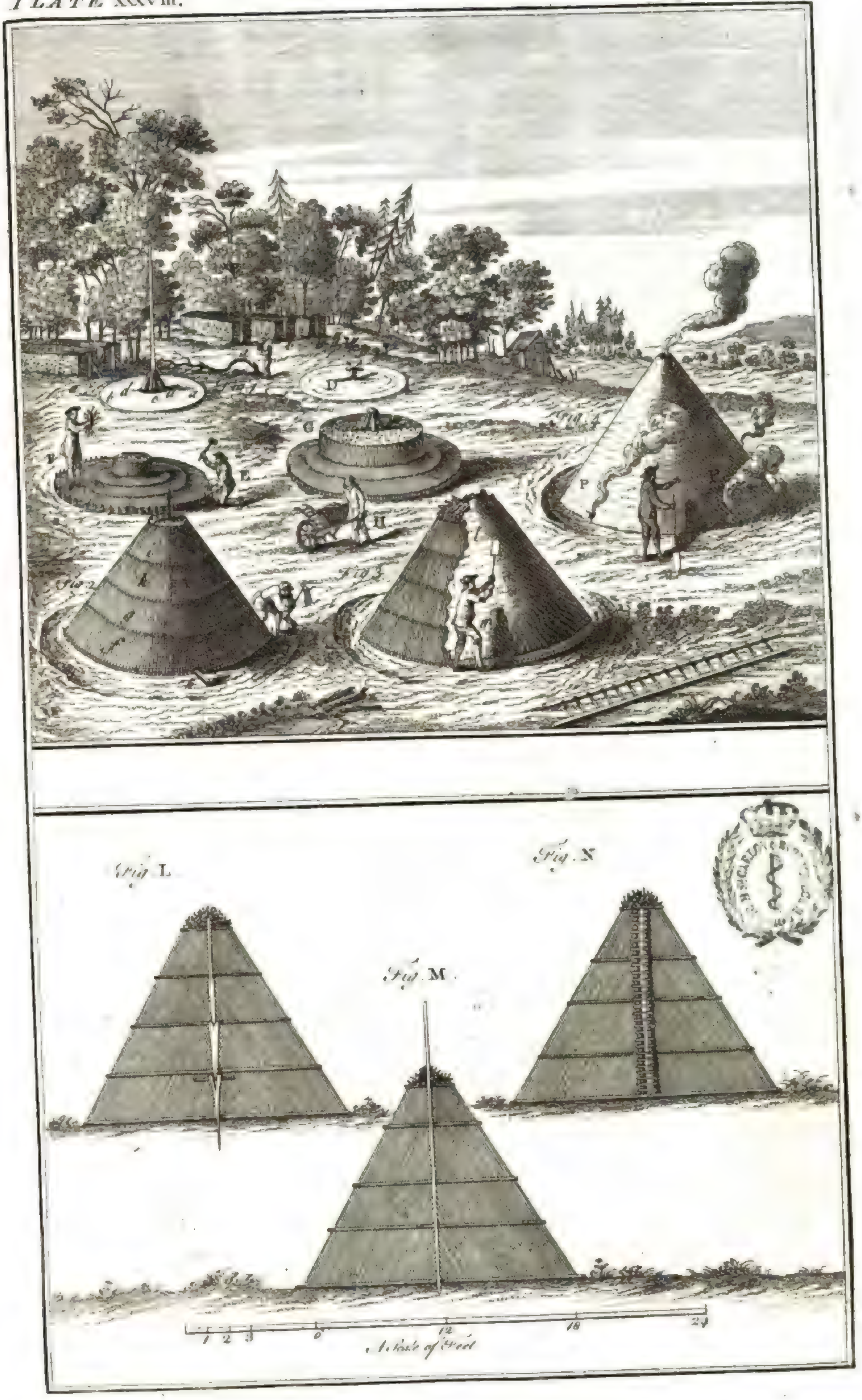
CHARCOAL-MAKING, the operation of charing wood, which is performed in the following manner: The wood intended for this purpoſe is cut into proper lengths, and piled up in heaps near the place where the charcoal is intended to be made: when a ſufficient quantity of wood is thus prepared, they begin conſtructing their ſtacks, for which there are three methods; the firſt is this: They level a proper ſpot of ground, of about twelve or fifteen feet in diameter, near the piles of wood; in the center of this area a large billet of wood, ſplit acroſs at one end and pointed at the other, is fixed with its pointed extremity in the earth, and two pieces of wood inſerted through the clefts of the other end, forming four right-angles; againſt theſe croſs pieces four other billets of wood are placed, one end on the ground, and the other leaning againſt the angles.

This being finiſhed, a number of large and ſtraight billets, are laid on the ground to form a floor each being as it were the radius of the circular area; on this floor a proper quantity of bruſh or ſmall wood is ſtrewed, in order to fill up the interſtices, when the floor will be complete; and in order to keep the billets in the ſame order and poſition they were firſt arranged, pegs or ſtumps are driven into the ground in the circumference of the circle, about a foot diſtant from one another; upon this floor a ſtage is built with billets ſet upon one end, but ſomething inclining towards the central billet, and on the tops of theſe another floor is laid in a horizontal direction, but of ſhorter billets, as the whole is, when finiſhed, to form a cone.

The ſecond method of building the ſtacks for making charcoal is performed in this manner: A long pole is erected in the centre of the area above deſcribed, and ſeveral ſmall billets ranged round the pole on their ends; the interſtices between theſe billets and the pole is filled with dry bruſh-wood, then a floor is laid, on that a ſtage in a reclining poſition, and on that a ſecond floor, &c. in the ſame manner as deſcribed above; but in the lower floor there is a billet larger and longer than the reſt, extending from the central pole to ſome diſtance beyond the circumference of the circle.

The third method is this: A chimney, or aperture of a ſquare form is built with billets in the center, from the bottom to the top, and round theſe floors and inclined ſtages are erected in the ſame manner as in the ſtacks above deſcribed, except that the baſe of this, inſtead of

PLATE XXVIII. Facing Charcoal Making


b
d
c
a
Fig. 1
D
G
Fig. 4
F
E
H
Fig. 3
Fig. 2
P
P
i
k
g
f
l
m
Fig. L
Fig. N
Fig. M
1
2
3
6
12
18
24
A Scale of Feet

of being circular like the others, is ſquare; and the whole ſtack, when compleated, forms a pyramid.

The ſtack of either form being thus finiſhed, is coated over with turf, and the ſurface plaiſtered with a mixture of earth and charcoal duſt well tempered together.

The next operation is the ſetting the ſtack on fire: in order to this, if it be formed according to the firſt conſtruction, the central billet in the upper ſtage is drawn out, and ſome pieces of very dry and combuſtible wood are placed in the void ſpace, called, by workmen, the chimney, and fire ſet to theſe pieces. If the ſtack be built according to the ſecond conſtruction, the central pole is drawn out, together with the large horizontal billet above deſcribed, and the void ſpace occupied by the latter being filled with pieces of very dry combuſtible wood, the fire is applied to it at the baſe of the ſtack. With regard to the third conſtruction, the ſquare aperture or chimney is filled with ſmall pieces of very dry wood, and the fire applied to it at the top or apex of the pyramidical ſtack.

When the ſtack is ſet on fire, either at the top or bottom, the greateſt attention is neceſſary in the workman; for in the proper management of the fire, the chief difficulty attending the art of making good charcoal conſiſts. In order to this, care is taken, as ſoon as the flame begins to iſſue ſome height above the chimney, that the aperture be covered with a piece of turf; but not ſo cloſe as to hinder the ſmoke from paſſing out: and whenever the ſmoke appears to iſſue very thick from any part of the pile, the aperture muſt be covered with a mixture of earth and charcoal duſt. At the ſame time, as it is neceſſary that every part of the ſtack ſhould be equally burnt, it will be requiſite for the workman to open vents in one part, and ſtop them in another.

In this manner the fire muſt be kept up till the charcoal be ſufficiently burnt, which will happen in about two days and a half, if the wood be dry; but if green, the operation will not be finiſhed in leſs than three days. When the charchoal is thought to be ſufficiently burnt, which is eaſily known from the appearance of the ſmoke, and the flames no longer iſſuing with impetuoſity thro' the vents; all the apertures are to be cloſed up very carefully, with a mixture of earth and charcoal duſt, which, by excluding all acceſs of the eternal air, prevents the coals from being any farther conſumed, and the fire goes out of itſelf. In this condition it is ſuffered to remain till the whole is ſufficiently cooled, when the cover of earth is removed, and the charcoal taken away. If the whole proceſs be ſkilfully managed, the coals will exactly retain the figure of the pieces of wood: ſome are ſaid to have been ſo dextrous as to char an arrow, without altering the form even of the feather.

But the whole proceſs will be more eaſily underſtood from the following explanation of plate XXXVIII. where the whole is repreſented.

The upper compartment is a perſpective view of an open part of a wood, with ſeveral ſtacks for making charcoal.

The piles of wood ready for forming the ſtacks are ſeen at *a*, *a*, *b*, *b*.

Fig. 1. repreſents the areas of two ſtacks, according to the firſt and ſecond conſtruction. D is the area of the firſt conſtruction, in the center of which appears the billet, with others inſerted in its ſlits, and forming four right-angles.

b a, repreſents the area of a ſtack according to the ſecond conſtruction; *c*, the centrical pole, and *d*, *d*, billets placed in a proper poſition round it.

E, F, is the floor of a ſtack, according to the firſt conſtruction.

The workman at E is driving pegs or ſtumps into the ground, in order to faſten the floor; while the other perſon at F is throwing bruſh-wood on the floor, in order to fill the interſtices. In the center is ſeen the beginning of the firſt ſtage of the ſtack.

G repreſents the firſt ſtage in greater forwardneſs; together with the central billet of the ſecond.

H, a workman carrying billets in a wheel-barrow.

Fig. 2. repreſents a ſtack of the firſt conſtruction, conſiſting of four ſtages, *f*, *g*, *h*, *i*, with floors at the bottom of each. *k* is the extremity of the large horizontal billet, extending to the center, and which is drawn out when the ſtack is finiſhed, in order to open a paſſage to the chimney, and leave an opening for lighting the fire.

Fig. 3. repreſents a furnace of either the firſt or ſecond conſtruction, the intention of the figure being to repreſent the manner of finiſhing the external caſe or coat of the ſtack. *m* is a workman ſmoothing the outward coat, by means of an inſtrument *l*, conſiſting of a piece of ſmooth board faſtened to a handle of conſiderable length.

Fig. 4. repreſents a ſtack of the ſecond conſtruction on fire, with the ſmoke iſſuing through the chimney, and the vents at P, P.

Lower Compartment of the Plate.

Fig. L. is a vertical ſection of a ſtack, according to the firſt conſtruction.

Fig. M. a vertical ſection of a ſtack, according to the ſecond conſtruction. And

Fig. N. a vertical ſection of a ſtack, according to the third conſtruction.

CHARDS *of Artichokes*, in gardening, the leaves of fair artichoke plants, tied and wrapped up in ſtraw all over, but the top, during the autumn and winter; this makes them grow white, and loſe ſome of their bitterneſs.

CHARDS *of Beets*, white beets covered over with dry dung, during the winter-ſeaſon, when they produce large tops, with a downy cotton ſhoot, which is the true chard to be uſed in pottages, intermaſſes, &c.

CHARGE, in gunnery, the quantity of gun-powder and ball, wherewith a gun is loaded for execution.

The rule for charging large pieces in war, are, that the piece be firſt cleaned or ſcoured within-ſide; that the proper quantity of powder be next driven in and rammed down; care however being taken that the powder, in ramming, be not bruiſed, becauſe that weakens its effect; that a little quantity of paper, hay, lint, or the like, be rammed over it; and that the ball or ſhot be intruded.

If the ball be red-hot, a tompion, or trencher of green wood, is to be driven in before it.

The common allowance for the charge of powder of a piece of ordnance is half the weight of the ball. In the Britiſh navy, the allowance for thirty-two pounders is but ſeven ſixteenths of the weight of the bullet. But a late author is of opinion, that if the powder in all ſhip cannon whatever was reduced to one-third of the weight of the ball, or even leſs, it would be of conſiderable advantage, not only by ſaving ammunition, but by keeping the guns cooler and quieter, and at the ſame time more effectually injuring the veſſels of the enemy. With the preſent allowance of powder the guns are heated, and their tackle and furniture ſtrained, and this only to render the bullets leſs efficacious: for a bullet which can but juſt paſs through a piece of timber, and loſes almoſt all its motion thereby, has a much better chance of rending and fracturing it, than if it paſſes through with a much greater velocity. *Vid. Robins's Propoſ. for Increaſing the Strength of the Britiſh Navy.*

CHARGE, in heraldry, is applied to the figures repreſented on the eſcutcheon, by which the bearings are diſtinguiſhed from one another: and it is to be obſerved, that too many charges are not ſo honourable as fewer.

CHARGE, in the manege, a preparation, or ointment, of the conſiſtence of a thick decoction, applied to ſhoulder-ſplaits, inflammations, and ſprains of horſes: the parts affected are rubbed, and chaffed with this compoſition, after which they ſhould be covered with ſinking paper.

This unguent is made up of honey, oil, greaſe, turpentine, and ſometimes lees of wine, and other matters.

Charges are outward applications to the bodies of horſes, &c. and are prepared divers ways, according to the nature of the diſeaſe.

CHARGE, or **OVERCHARGE**, in painting, an exaggerated repreſentation of any perſon, wherein the likeneſs is preſerved, but withal ridiculed: few painters have the genius to ſucceed in theſe charges. The method is, to pick out and heighten ſomething amiſs in the face, whether by way of defect or redundancy; thus, if nature has given a man a noſe a little larger than ordinary, the painter falls in with her, and makes the noſe extravagantly long; and ſo in other caſes.

CHARGE *of Lead* denotes a quantity of thirty-ſix pigs.

CHARGED, in heraldry, a ſhield carrying ſome impreſs or figure is ſaid to be charged therewith; ſo alſo when one bearing, or charge, has another figure added upon it, it is properly ſaid to be charged.

CHARGED CYLINDER, in the art of war, is that part of the chace of a gun where the powder and ball are contained.

CHARIOT, a half coach, having only a ſeat behind, with a ſtool at moſt before.

Triumphal CHARIOT was one of the principal ornaments of the Roman celebration of a victory. See TRIUMPH.

The Roman triumphal chariot was generally made of ivory, round like a tower, or rather of a cylindrical figure; it was ſometimes gilt at the top, and ornamented with crowns; and to repreſent a victory more naturally, they uſed to ſtain it with blood. It was uſually drawn by four white horſes, but oftentimes by lions, elephants, tygers, bears, leopards, dogs, &c.

CHARISIA, in heathen antiquity, a nocturnal feſtival, kept in honour of the graces, and conſiſting chiefly of dancing; only that ſweet-meats, called likewiſe chariſia, were diſtributed among thoſe preſent.

CHARITY, among divines, one of the three grand theological virtues, conſiſting in the love of God, and of our neighbour, or the habit and diſpoſition of loving God with all our heart, and our neighbour as ourſelves.

CHARITY, among moraliſts, is uſed for the effect of a moral virtue; and conſiſts in ſupplying the neceſſities of others, whether with money, council, aſſiſtance, or the like.

CHARITY *of our Lady*, in church hiſtory, a religious order in France, which, though charity was the principal motive of their union, grew in length of time ſo diſorderly and irregular, that their order dwindled, and at laſt became extinct.

There is ſtill at Paris a religious order of women, called nuns hoſpitallers of the charity of our lady. The religious of this hoſpital are by vow obliged to adminiſter to the neceſſities of the poor and the ſick, but thoſe only women.

CHARITY *of St. Hippolitus*, a religious congregation founded about the end of the ſixteenth century, by one Bernardine Alvarez, a Mexican, in honour of St. Hippolitus the martyr, patron of the city of Mexico, and approved by pope Gregory XIII.

CHARITY-SCHOOLS, are ſchools erected and maintained by various pariſhes, by the voluntary contributions of the inhabitants, for teaching poor children to read and write, and other neceſſary parts of education. In moſt charity-ſchools the children are likewiſe cloathed and put out to trades, ſervices, &c. on the ſame charitable foundation.

CHARKING, or CHARING, the making of charcoal. See CHARCOAL-MAKING.

CHARLATAN, or CHARLETAN, an empiric, or quack, who retails his medicines on a public ſtage, and draws the people about him with his buffoonries, feats of activity, &c. See the article EMPIRIC.

CHARLES's-WAIN, in aſtronomy, ſeven ſtars in the conſtellation called urſa major, or the great bear. See URSA.

CHARLOCK, the Engliſh name of a plant called by botaniſts, rapiſtrum, or crambe. See the article CRAMBE.

Charlock is a very troubleſome weed in corn-fields, where we find two ſpecies of it very common, viz. one with a yellow flower, and the other with a white one. To prevent its growth the farmers mix horſe dung with their cow dung uſed in manure, as the laſt is very apt to breed the charlock. When a field of barley is much infeſted with it, they mow it down in May, when in flower, taking care only to cut it ſo low as juſt to take off the tops of the leaves of the barley.

CHARM, a term derived from the Latin, *carmen*, a verſe, and uſed to denote a magic power, or ſpell, by which, with the aſſiſtance of the devil, ſorcerers and witches were ſuppoſed to do wonderful things, far ſurpaſſing the power of nature. Theſe things are now ſufficiently exploded.

CHARNEL, or CHARNEL-HOUSE, a kind of portico, or gallery, uſually in or near a church-yard, over which were anciently laid the bones of the dead, after the fleſh was wholly conſumed.

Charnel-houſes are now uſually adjoining to the church.

CHARRE, or GILT-CHARRE, a truttaceous fiſh, called by many carpio, and reckoned by Artedi a ſpecies of ſalmon, leſs than a foot in length, with five rows of teeth in its palate.

Red CHARRE is likewiſe a ſpecies of ſalmon, called by authors umbla minor: it is much of the ſame ſize with the former, with the belly-fin red, and the under-jaw a little longer than the upper-one.

CHART, or SEA-CHART, an hydrographical map, or a projection of ſome parts of the earth's ſuperficies in plano, for the uſe of navigators.

Charts differ very conſiderably from geographical or land maps, which are of no uſe in navigation. Nor are ſea-charts all of the ſame kind, ſome being what we call plane-charts, others mercator-charts, and others globular charts.

Plane CHART is a repreſentation of ſome part of the ſuperficies of the terraqueous globe, in which the meridians are ſuppoſed parallel to each other, the parallels of latitude at equal diſtances, and conſequently the degrees of latitude and longitude every where equal to each other. See PLANE *Chart*.

Mercator's CHART is that where the meridians are ſtraight lines, parallel to each other, and equidiſtant; the parallels are alſo ſtraight lines, and parallel to each other: but the diſtance between them increaſes from the equinoctial towards either pole, in the ratio of the ſecant of the latitude to the radius. See MERCATOR's *Chart*.

Globular CHART, a meridional projection, wherein the diſtance of the eye from the plane of the meridian, upon which the projection is made, is ſuppoſed to be equal to the ſine of the angle of 45°. This projection comes the neareſt of all to the nature of the globe, becauſe the meridians therein are placed at equal diſtances; the parallels alſo are nearly equidiſtant, and conſequently the ſeveral parts of the earth have their proper proportion of magnitude, diſtance, and ſituation, nearly the ſame as on the globe itſelf. See GLOBULAR *Projection*.

Chorographic CHARTS, deſcriptions of particular countries. See CHOROGRAPHY.

Heliographic CHARTS, deſcriptions of the body of the ſun, and of the maculæ or ſpots obſerved in it. See HELIOGRAPHY.

Hydrographic CHARTS, ſheets of large paper, whereon ſeveral parts of the land and ſea are deſcribed, with their reſpective coaſts, harbours, ſounds, flats, rocks, ſhelves, ſands, &c. together with the longitude and latitude of each place, and the points of the compaſs. See the article MERCATOR's *Chart*.

Selenographic CHARTS, particular deſcriptions of the ſpots, appearances, and maculæ of the moon. See the article SELENOGRAPHY.

Topographic CHARTS, draughts of ſome ſmall parts of the earth only, or of ſome particular places, without regard to its relative ſituation, as London, York, &c.

CHARTA-MAGNA, an ancient inſtrument, containing ſeveral privileges and liberties granted to the church and ſtate by Edward the Confeſſor, together with others relating to the feudal laws of William the Conqueror, granted by Henry I. all confirmed by the ſucceeding princes. See the article MAGNA-CHARTA.

CHARTER, in law, a written inſtrument or evidence of things acted between one perſon and another.

Charters of private perſons are deeds and inſtruments for the conveyance of lands, &c. Here the purchaſer of land ſhall have all the charters and deeds, as incident to the ſame, and for the maintenance of his titie. But this is underſtood where the feoffer is not bound to a general warranty of the land.

Great CHARTER, MAGNA-CHARTA. See the article MAGNA-CHARTA.

CHARTER *of the King* is where the king makes a grant to any perſon or body politic, as a charter of exemption, of privilege, pardon, &c.

CHARTER-LAND, ſuch land as a perſon holds by charter; that is, by evidence in writing, otherwiſe termed freehold. See the article FREEHOLD.

CHARTY-PARTY, in commerce, a deed or writing indented; that is, made between merchants and ſeafaring men, concerning their merchandiſe and maritime affairs.

A charter-party of affreightment, ſettles the agreement in relation to the freight of a ſhip and cargo, between the merchant and commander or maſter of the veſſel. It binds the maſter to deliver the cargo in good condition at the place of diſcharge, &c.

In thoſe charter-parties, if the dangers of the ſea are excepted, it has been adjudged that ſuch exception extends as well to any danger upon the ſea from pirates or men of war, as to common dangers by ſhipwreck, tempeſts, &c.

CHARTIS REDDENDIS, in law, a writ that lies againſt a perſon who having charters of feoffment delivered to him to keep, afterwards refuſes to deliver them.

CHARYBDIS, a rock in the ſtreight of Meſſina, between Italy and Sicily, much celebrated in the writings of ancient poets.

CHASE, a great quantity of ground lying open and privileged for wild beaſts and wild fowl. Such is Enfield-chaſe.

A chaſe differs from a foreſt, inaſmuch as it may be in the hands of a ſubject, which a foreſt in its proper nature cannot; and from a park, in that it is not incloſed, and hath more officers. A chaſe is not endowed like a foreſt with ſo many liberties, as the courts of attachment, ſwainmore, and juſtice-ſeat; and cannot lawfully be made, without licenſe from the king under the broad ſeal.

CHASING *of Gold, Silver, &c.* See the article ENCHASING.

CHASTE-TREE, the Engliſh name of the vitex. See the article VITEX.

CHASTISEMENT, in the manege, the ſevere and rigorous effect of the aids; for when the aids are given with ſeverity, they become puniſhments. See the article AIDS.

CHAZINZARIANS, in church hiſtory, a ſect of heretics who adored the croſs. *Chazus* ſignifies the croſs in the Armenian language. They aroſe in Armenia in the ſeventh century.

CHECK, or CHECK-ROLL, a roll or book, wherein is contained the names of ſuch perſons as are attendants and in pay to the king, or other great perſonages, as the houſhold ſervants.

Clerk of the CHECK, in the king's houſhold, has the check and controulment of the yeomen of the guard, and all the uſhers belonging to the royal family, allowing their abſence or defects in attendance, or diminiſhing their wages for the ſame, &c. He alſo, by himſelf or deputy, takes the view of thoſe that are to watch in the court, and has the ſetting of the watch, &c.

Clerk of the CHECK, in the king's navy, is alſo the name of an officer inveſted with the like power at the ſeveral dock-yards.

CHECKY, in heraldry, is when the ſhield, or a part thereof, as a bordure, &c. is chequered, or divided into chequers or ſquares, in the manner of a cheſs-board.

This is one of the moſt noble and ancient figures uſed in armory; and a certain author ſays, that it ought to be given to none but great warriors, in token of their bravery; for the cheſs-board repreſents a field of battle, and the pawns of men, placed on both ſides, repreſent the ſoldiers of the two armies, which move, attack, advance, or retire, according to the will of the two gameſters, who are the generals.

This figure is always compoſed of metal and colour: but ſome authors would have it reckoned among the ſeveral ſorts of furs.

CHEEK, in anatomy, that part of the face ſituated below the eyes, on each ſide. Wounds of the cheeks, if ſmall, may be cured by the dry ſuture; but if large, the bloody one muſt be uſed. See the article SUTURE.

CHEEKS, among mechanics, are almoſt all thoſe pieces of their machines and inſtruments, that are double, and perfectly alike; as the cheeks of a mortar, which are made of ſtrong wooden planks, of a ſemi-circular form, bound with thick plates of iron, and fixed to the bed with four bolts: theſe cheeks riſe on each ſide the mortar, and ſerve to keep it at what elevation is given it: the cheeks of a printing-preſs are its two principal pieces, placed perpendicular and parallel to each other, and ſerving to ſuſtain the three ſommers, &c.

CHEEKS *of the Maſt*, in naval affairs, certain projecting parts ſituated on the upper-end of the maſt for ſuſtaining the weight of the top-maſt which reſts upon them below, and is kept ſteady above by the cap. See CAP and TRUSSEL-TREES.

CHEESE, *Caſeus*, a ſort of food, prepared of curdled milk, purged from the ſerum or whey, and afterwards dried for uſe.

Phyſicians condemn the too free uſe of cheeſe, by reaſon it loads the ſtomach when new, and heats and inflames when old.

Every country has its place noted for this commodity. Thus Cheſter and Glouceſter-cheeſe are famous in England; and the Parmeſan cheeſe is in no leſs repute abroad, eſpecially in France. This ſort of cheeſe is entirely made of ſweet cow's milk: but at Rochfort, in Languedoc, they make cheeſe of ewe's milk; and in other places, it is uſual to add goat or ewe's milk, in a certain proportion, to that of cow's.

There is likewiſe a kind of medicated cheeſe, made by intimately mixing the expreſſed juice of certain herbs, as ſage, baum, mint, &c. with the churd, before it is faſhioned into a cheeſe.

CHEESE-RUNNET, in botany, the ſame with the gallium of authors. See the article GALLIUM.

CHEESLIP-BAG, that in which houſewives prepare and keep their runnet for making cheeſe. See RUNNET.

CHELIDONIUM *Majus*, celandine, in botany, a genus of plants, with longiſh leaves, divided to the rib into roundiſh indented portions, of which thoſe at the extremities are much larger than the others, of a bright green colour on the upper-ſide, bluiſh green underneath, full of a gold coloured juice, as are likewiſe the ſtalks: from the boſoms of the leaves iſſue long pedicles, bearing cluſters of tetrapetalous yellow flowers, which are followed by browniſh pods, containing flattiſh ſhining black ſeeds: the root is pretty thick at the top, with a number of fibres at bottom, externally browniſh, internally of a deep yellowiſh red or ſaffron colour. It is perennial, grows wild in hedges and ſhady waſte places, and flowers in May.

It is a very acrid plant, and ſtands recommended as a a powerful aperient and attenuant, in obſtinate jaundices, when not accompanied with inflammatory ſymptoms, in cachexies, chloroſes, dropſies, and other diſeaſes. Half a dram or a dram of the dry root in powder; or an infuſion, in wine or water, of a dram or a dram and a half of the freſh root; or three or four drops of its ſaffron-coloured juice, in any convenient vehicle, are directed for a doſe. Great caution is requiſite in the internal uſe of a medicine ſo acrimonious and irritating; more particularly in acute diſtempers, in which infuſions of it, made in vinegar, have by ſome been recommended as a ſudorific. Among us, it is employed chiefly by the common people for ſome external purpoſes; as the deſtroying of warts, cleanſing foul ſores, removing ſome cutaneous defedations, and clouds and beginning ſuffuſions of the eyes: for this laſt intention, the juice is diluted largely with milk, being of itſelf much too ſharp to be applied with ſafety to ſo tender an organ.

CHELIDONIUM *Minus*, pilewort, in botany, a ſmall plant, with roundiſh, ſmooth, ſhining, green leaves, ſet on long pedicles, and ſlender procumbent ſtalks, bearing bright gold-coloured ſolitary flowers, of eight or nine petala, which ſtand in three-leaved cups, and are followed by cluſters of naked ſeeds: the root conſiſts of ſlender fibres, with a number of tubercles or little knobs among them. It is perennial, grows wild in hedges and moiſt meadows, and flowers in April.

The leaves of pilewort are ranked among the antiſcorbutics, but do not promiſe to be of much virtue. The roots are celebrated as a ſpecific againſt the piles: they have been ſometimes given inwardly, but chiefly applied externally, in the form of a cataplaſm, lotion, or unguent.

CHEMA, or CHEME, in antiquity, a meaſure, among the ancient phyſicians, containing two ſpoonfuls: it was the fifth part of the cyathus or cup: full of oil, it weighed two drams, and ſeventeen grains.

CHEMIN DES RONDES, in fortification, a ſpace between the rampart and low parapet under it, for the rounds to go about the ſame.

CHEMISE, in fortification, the wall with which a baſtion, or any other bulwark of earth, is lined for its greater ſupport and ſtrength: or it is the ſolidity of the wall from the talus to the ſtone-row.

Fire CHEMISE, a piece of linen-cloth, ſteeped in a compoſition of oil of petrol, camphor, and other combuſtible matters, uſed at ſea, to ſet fire to an enemy's veſſel.

CHEMICAL *Laboratory*, or *Elaboratory*, the place where chemical proceſſes are performed.

Explanation of plate XXXIX. repreſenting a chemical laboratory.

1. A reverberatory furnace for diſtilling oil of vitriol, &c. with thirty-two long-necks.

a, *a*, *a*, *a*, the receivers. *b*, *b*, *b*, *b*, the necks of the long-necks, the bodies being placed within the furnace. *c*, the fire-place. *d*, the aſh-hole.

2. A large furnace, in which flowers of ſulphur are ſublimed in a great quantity.

a, the fire-place. *b*, the aſh-hole. *c*, a door into the body of the furnace, by which the flowers are taken out.

3. A melting furnace. *a*, *b*, two ſmall doors to the fire-place, to be opened occaſionally, when it is neceſſary to inſpect the matter acted on by the fire, or to add fuel. *c*, a large door, to be opened when a crucible is to be ſet in or taken out of the furnace.

4. A pelican, or circulatory veſſel.

5. A ſubliming furnace. *d*, the body of the furnace. *a*, the body into which the matter to be ſublimed is projected. *b*, *b*, *b*, three aludels. *c*, the head.

6. A tubulated retort.

7. A body and head.

8. An adopter. *a*, a glaſs vent-tube fitted to its ſmall end.

9. A retort.

10. A melter's horn, or antimonial cone.

11. A commodious apparatus for making ſpirit of ſulphur. *a*, a large retort with a hole in its bottom. *f*, a tubulated receiver, with the ſpout upwards. *e*, a glaſs mortar. *d*, a concave glaſs plate, with a hole in the middle. *c*, a gallipot inverted over the perforation in *d*. *b*, a crucible containing burning ſulphur.

12. A German crucible.

13. A muffle.

14. A black lead crucible.

15. A cupel or coppel.

16. An alembic head.

17. A blind head.

18. An adopter.

19. A receiver.

20. An earthen long-neck for diſtilling oil of vitriol, &c.

21. A furnace for digeſtions, &c.

22. A furnace for diſtilling harts-horn in quantity. B, the furnace, containing an iron pot. *c*, an earthen head. *b*, *b*, two receivers.

23. A furnace for diſtilling with a retort on an open fire. *d*, a coated retort placed in the furnace.

24. A furnace for diſtilling in balneum mariæ. D, the furnace, containing an iron pot filled with water. *e*, the veſſel, containing the ingredients placed in the water. *d*, a glaſs head. *c*, a receiver.

25. A ſmall furnace for boiling ſyrups, &c.

26. A furnace for melting, boiling, &c. M, the bellows. *f*, a glaſs body in a copper veſſel filled with water, placed over the furnace.

27. A furnace for making ſpirit of ſal ammoniac, &c. G, the furnace. *a*, a retort placed in the furnace. *g*, a large receiver.

28. An apparatus for procuring the volatile ſalt of ſal armoniac, &c. in a dry form. *k*, a retort placed in the furnace. *i*, an adopter. *h*, a receiver.

29. A ſand-heat, with a retort and receiver.

30. A coldeſtill. *n*, the head. *o*, the receiver.

31. An open furnace for extracting volatile ſalts, as from vipers, &c. *q*, a coated retort placed in the furnace on an open fire. *p*, the receiver.

32. A furnace for digeſtions, tinctures, &c. *f*, a veſſel, containing the ingredients to be digeſted. *r*, a blind head.

33. Two ſtills at work with one common refrigeratory. *a*, the body of the largeſt ſtill. *b*, its head. *f*, the receiver. *e*, the body of the ſmalleſt ſtill. *d*, its head. *g*, a ſpout receiver for ſeparating oil from water.

CHEMISTRY, *χημια*, is an art that teaches us how to perform certain phyſical operations, by which bodies that are diſcernible by the ſenſes, or that may be rendered ſo, and that are capable of being contained in veſſels, may, by ſuitable inſtruments, be ſo changed, that particular determined effects may be thence produced, and the cauſes of theſe effects underſtood by the effects themſelves, to the manifold improvement of various arts.

If we endeavour to find the origin of this art, we muſt look back into the antediluvian world, where it was practiſed, as ſome think, by Cham, the ſon of Noah; but the invention is more commonly aſcribed to Tubal-Cain, who firſt prepared braſs and iron for the uſe of man, which he could not have done without a competent knowledge of chemiſtry. Profane authors refer it to Vulcan; and ſeveral learned men have made it appear very probable that Tubal-Cain and Vulcan were the ſame which, ſeems to be confirmed by the great reſemblance between their names. The next chemiſt we read of is Moſes, whoſe ſkill in this art is evident from his burning and pulverizing the golden calf, and giving it the people to drink; for the rendering gold potable is one of the moſt difficult operations in chemiſtry: but ſome ſuppoſe that this was done by a miraculous power. The invention of chemiſtry is by others referred to Hermes Triſmegiſtus, an ancient king of Egypt, from whom it has obtained the name of the Hermetic art. From the Arabians, by whom the art was eſteemed and practiſed, it ſeems to have had the name of alchemy; but theſe people rendered it ridiculous by their extravagant ſuperſtitious reaſonings, and their pretended tranſmutation of metals. And here it is to be obſerved, that chemiſtry at firſt had only metals for its object; whereas the bounds of it have been much enlarged in later ages, being extended to the animal and vegetable as well as the mineral kingdom; and the moderns have applied it with great ſucceſs to the preparation of medicines for curing the diſeaſes of the human body.

At the declenſion of the Eaſtern empire, chemiſtry ſhared the common fate of the other arts, and lay buried and neglected till the time of our friar Bacon, by whom it was in a great meaſure retrieved. He was followed by Raymund Lully, Baſil Valentine, Paracelſus, Van Helmont, and others, who ſpread the art in Spain, Italy, and Germany; and the two laſt eſpecially carried it to ſuch a length, as to render medicine almoſt wholly chemical. Lemery a Frenchman, Homberg an Eaſt-Indian, and our ingenious countryman Mr. Boyle, diſperſed the darkneſs of the art, reducing it to ſimple and true ideas, and aboliſhing thoſe uſeleſs and impracticable circumſtances, with which ſome of their predeceſſors had deſignedly clogged its operations. But of all the moderns none have made greater improvements in chemiſtry, or more judiciouſly and beneficially introduced it into medicine, than the late celebrated Boerhaave, who is alſo the fulleſt and beſt writer on the ſubject, having given us the hiſtory, theory, and practice of this noble art in an orderly and ſcientifical manner.

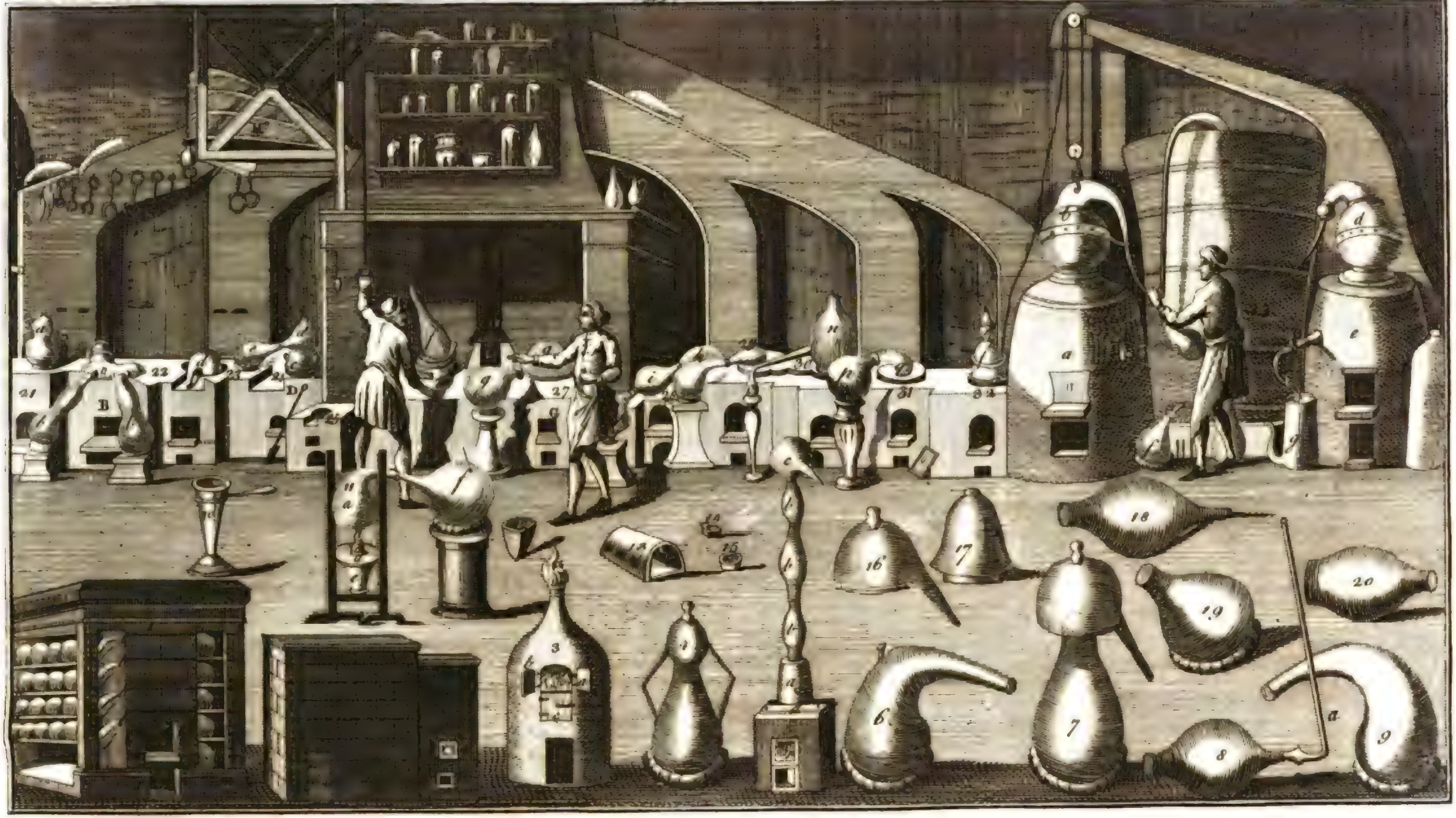
CHEQ, or CHERIF, the prince of Mecca, who is, as it were, high prieſt of the law, and ſovereign pontiff of all the Mahometans, of whatſoever ſect or country they be. See CALIPH.

CHEREM, in Jewiſh antiquity, the ſecond and greater ſort of excommunication among the Jews.

CHERRY-TREE, *Ceraſus*, in botany. See CERASUS.

PLATE XXXIX.

Facing CHEMICAL laboratory.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CHERT, among miners, denotes a kind of flinty ſtone, found in thin ſtrata in quarries of lime-ſtone.

CHERUB, or CHERUBIN, a celeſtial ſpirit, which in the hierarchy is placed next to the ſeraphim. See HIERARCHY.

The ſeveral deſcriptions which the Scripture gives us of cherubins, differ from one another: but all agree in repreſenting a figure compoſed of various creatures, as a man, an ox, an eagle, and a lion.

CHERUBIN was alſo the name of an ancient military order in Sweden, otherwiſe called the order of ſeraphim. It was inſtituted by Magnus IV. and aboliſhed by Charles IX. It took its denomination from the golden figures of cherubins, whereof the collar of the order was compoſed.

CHERUBICAL-HYMN, a hymn of great note in the ancient Chriſtian church. It was likewiſe called triſagium, or thrice holy, becauſe the form of it was in theſe words, “Holy, holy, holy, Lord God of hoſts, &c.”

CHERVIL, *Chærophyllum*, in botany. See the article CHÆROPHYLLUM.

CHESNUT-TREE, the Engliſh name of the caſtanea of botaniſts. See the article CASTANEA.

CHEST, in commerce, a kind of meaſure, containing an uncertain quantity of ſeveral commodities.

A cheſt of ſugar, v. g. contains from ten to fifteen hundred weight; a cheſt of glaſs, from two hundred to three hundred feet; of Caſtile ſope, from two and an half to three hundred weight; of indigo, from one and an half to two hundred weight, five ſcore and twelve pounds to the hundred.

CHEST, in anatomy, the breaſt, or that part of the body which contains the heart and lungs. See the article BREAST.

CHESSTREE, in naval affairs, a piece of wood which ſtands up and down edgeways, bolted to the ſhips ſide: there is a large hole in it, through which the rope, called the tack, is paſſed, which is faſtened to the clue or lower corner of the main-ſail; and when the clue of the ſail comes down to the cheſtree, the tack is ſaid to be aboard. *Shipwreck, p.* 51. *in the Notes.*

CHEVAGE, or CHIEFAGE, a tribute of a certain ſum of money, formerly paid by ſuch as held lands in villainage to their lords, by way of acknowledgment, being a kind of poll, or head-money.

CHEVALER, in the manege, is ſaid of a horſe when in paſſaging upon a walk or trot, his off fore-leg croſſes or overlaps the near fore-leg every ſecond motion.

CHEVALIER, in a general ſenſe, ſignifies a knight, or horſeman: but

CHEVALIER, in heraldry, ſignifies any cavalier, or horſeman, armed at all points, by the Romans called cataphractus eques; now out of uſe, and only to be ſeen in coat-armour.

CHEVAUX DE FRISE, in fortification, a large joiſt or piece of timber, about a foot in diameter, and ten or twelve in length; into the ſides whereof are driven a great number of wooden pins, about ſix foot long, armed with iron points, and croſſing one another. See plate XXXVII. *fig.* 7.

The chief uſe of the chevaux de friſe, is to ſtop up breaches, or to ſecure the avenues of a camp, from the inroads both of horſe and foot. It is ſometimes alſo mounted on wheels, with artificial fires, to roll down in an aſſault.

CHEVISANCE, in law, denotes an agreement or compoſition, as an end or order ſet down between a creditor and his debtor, &c.

In our ſtatutes, this word is moſt commonly uſed for an unlawful bargain, or contract.

CHEVRETTE, in the art of war, an engine for raiſing of guns or mortars into their carriages.

It is made of two pieces of wood, about four foot long, ſtanding upright upon a third ſquare piece: the upright pieces are about a foot aſunder, and pierced with holes exactly oppoſite to each other, having an iron bolt, which being put through theſe holes higher or lower, at pleaſure, ſerves with a hand-ſpike, which takes its poiſe over this bolt, to raiſe any thing by force.

CHEVRON, or CHEVERON, in heraldry, one of the honourable ordinaries of a ſhield, repreſenting two rafters of an houſe, joined together as they ought to ſtand: it was anciently the form of the prieſteſſes head attire: ſome ſay it is a ſymbol of protection; others, of conſtancy; others, that it repreſents knights ſpears, &c.

Per CHEVRON, in heraldry, is when the field is divided only by two ſingle lines, riſing from the two baſe points, and meeting in the point above, as the chevron does.

CHEVRONED, is when the coat is filled with an equal number of chevrons, of colour and metal.

CHEVRONEL, a diminutive of chevron, and as ſuch only containing half a chevron.

CHEVRONNE, or CHEVRONNY, ſignifies the dividing of the ſhield ſeveral times chevron-wiſe.

CHIAN EARTH, in pharmacy, one of the medicinal earths of the ancients, the name of which is preſerved in the catalogues of the materia medica, but of which nothing more than the name has been known for many ages in the ſhops.

It is a very denſe and compact earth, and is ſent hither in ſmall flat pieces from the iſland whoſe name it bears, and in which it is found in great plenty at this time. It ſtands recommended to us as an aſtringent. They tell us it is the greateſt of all coſmetics, and that it gives a whiteneſs and ſmoothneſs to the ſkin, and prevents wrinkles, beyond any of the other ſubſtances that have been celebrated for the ſame purpoſes.

CHIAOUS, a word in the original Turkiſh, ſignifying envoys, are officers to the number of five or ſix hundred in the grand ſignior's court, under the command of a chiaous baſchi. They frequently meet in the grand vizier's palace, that they may be in readineſs to execute his orders, and carry his diſpatches into all the provinces of the empire. The chiaous baſchi aſſiſts at the divan, and introduces thoſe who have buſineſs there.

CHIARO-SCURO, among painters. See the article CLARO-OBSCURO.

CHIAUSI, in the Turkiſh affairs, officers otherwiſe called mutes, employed in executing perſons of diſtinction; the orders for doing which are ſent them by the grand ſignior, wrapped up in a black cloth.

CHICANE, or CHICANRY, in law, an abuſe of judiciary proceeding, tending to delay the cauſe, to puzzle the judge, or impoſe upon the parties.

CHICANE, in the ſchools, is applied to vain ſophiſms, diſtinctions, and ſubtleties, which protract diſputes and obſcure the truth.

CHICHES, or CHICH-PEASE, the ſame with the cicer of botaniſts. See CICER.

CHICK, or CHICKEN, in zoology, denotes the young of the gallinaceous order of birds, eſpecially the common hen.

Chickens, for two days after hatching, require no meat; but then it is proper to give them, for the firſt time, ſmall oatmeal, ſome dry and ſome ſteeped in milk, or elſe fine white-bread crumbs; and after they have got ſtrength, curds, cheeſe pairing, &c. It is alſo very wholeſome to chop green chives among their meat, which will preſerve them from the rye, and other diſeaſes in the head; neither muſt they at any time be ſuffered to want clean water, ſince puddle-water is apt to breed the pip. To have fat crammed chickens, let them be cooped up when the dam forſakes them, and fed with wheat-meal in milk made into a dough, and ſteeped in milk; by uſing this diet, they will be fat in two weeks.

CHICK-WEED, *Alſine*, in botany. See the article ALSINE.

CHIEF, a term ſignifying the head or principal part of a thing or perſon. Thus we ſay, the chief of a party, the chief of a family, &c.

CHIEF, in heraldry, is that which takes up all the upper-part of the eſcutcheon from ſide to ſide, and repreſents a man's head.

In CHIEF, imports ſomething borne in the chief part or top of the eſcutcheon.

CHIEF-LORD, the feudal lord, or lord of an honour on whom others depend.

CHILBLAINS, in medicine, the ſame with what is otherwiſe called perniones. See the article PERNIO.

CHILD, a term of relation to parent.

Dr. Harris, in a treatiſe of the acute diſeaſes of children, takes them all to ariſe from the humours of the primæ viæ growing ſour and degenerating into acidities, which is confirmed from their ſour belching and dejections. Hence all that is required to cure them is to combat this acidity, which is to be effected two ways; by diſpoſing it to be evacuated, and by actual evacuation by rhubarb, and other gentle purgatives.

In the fiſt caſe, no ſudorifics or cordials are to be uſed, but in lieu of them, crabs-eyes and claws, oyſter-ſhells, egg-ſhells, chalk, coral, &c. but above all theſe, he prefers old ſhells that have lain long on the ſea ſhore expoſed to the heat of the ſun. Children are very obnoxious to the aphthæ, or thruſh, ſcabby eruptions, difficult dentition, epilepſy, worms, and rickets; for the cure of which, ſee each of theſe under its proper head. See alſo the articles Infant, Nursing, Weaning, &c.

Child-Bed, } See Delivery.
Child Birth, }

CHILDERMAS-DAY, or Innocent's-Day, an anniverſary held by the church, on the 28th of December, in commemoration of the children at Bethlehem, maſſacred by order of Herod.

CHILI, a kingdom of South America, bounded by Peru on the north, by the province of La Plata on the eaſt, by Patagonia on the ſouth, and by the Pacific ocean on the Weſt; lying between 25° and 45° ſouth latitude, and between 75° and 85° weſt longitude. But ſome comprehend Patagonia in Chili, extending it to Cape Horn, in 57° 30″ ſouth latitude.

CHILIAD, denotes a thouſand of any things, ranged in ſeveral diviſions, each whereof contains that number.

CHILIARCHA, or Chiliarchus, in antiquity, a military officer who had the command of a thouſand men.

CHILIASTS, in church hiſtory, the ſame with the millenarians. See the article Millenarians.

CHILMINAR, Chelminar, or Tchelminar, the moſt beautiful piece of architecture remaining of all antiquity, being the ruins of the famous palace of Perſepolis, to which Alexander the Great, in a drunken fit, ſet fire, at the inſtigation of Thais the courtezan. The word comes from the Perſian, *tchehle minar*, that is to ſay, forty towers.

CHIMERA, or Chimæra, a fabulous monſter which the poets feign to have the head of a lion, the body of a goat, and the tail of a dragon; and add, that this odd beaſt was killed by Bellerophon. The foundation of the fable was, that in Lycia there was a burning mountain, or vulcano, of this name; that the top of this mountain was ſeldom without lions, nor the middle, which had very good graſs, without goats; that ſerpents bred at the bottom, which was marſhy; and that Bellerophon rendered the mountain habitable.

By a chimera, among the philoſophers, is underſtood a mere creature of the imagination, compoſed of ſuch contradictions and abſurdities as cannot poſſibly any where exiſt but in thought.

CHIMES *of a Clock*, a kind of periodical muſic, produced at equal intervals of time, by means of a particular apparatus added to a clock.

In order to calculate numbers for the chimes, and adapt the chime-barrel, it muſt be obſerved that the barrel muſt turn round in the ſame time that the tune it is to play requires in ſinging. As for the chime-barrel, it may be made up of certain bars that run athwart it, with a convenient number of holes punched in them to put in the pins that are to draw each hammer; and theſe pins, in order to play the time of the tune rightly, muſt ſtand upright, or hang down from the bar, ſome more, ſome leſs. To place the pins rightly, you may proceed by the way of changes on bells, viz. 1, 2, 3, 4; or rather make uſe of the muſical notes. Obſerve what is the compaſs of your tune, and divide the barrel accordingly from end to end.

CHIMNEY, in architecture, a particular part of a houſe, where the fire is made, having a tube or funnel to carry away the ſmoke.

The parts of a chimney are the jambs, or ſides, coming out perpendicularly, ſometimes circularly, &c. from the back; the mantle-tree which reſts on the jambs; the tube, or funnel, which conveys away the ſmoke; the chimney-piece, or moulding, which is on the fore-ſide of the jambs, over the mantle-tree; and the hearth, or fire-place.

The rules for building chimnies are, 1. That no timber be laid within twelve inches of the fore-ſide of the chimney-jambs. 2. That all the joiſts on the back of any chimney be laid with a trimmer. 3. That no timber be laid within the funnel of any chimney.

The proportion for Chimnies. Wolfius directs that the breadth of the aperture at the bottom be to the height as 3 to 2, and to the depth as 4 to 2.

In ſmall apartments the breadth is 3 feet, in bedchambers 4, in larger apartments 5, in ſmall banqueting rooms 5 ½, in larger 6; but the height ſhould never exceed 2 ½, leſt there ſhould be too much room for air and wind, and the ſmoke be driven into the room: nor muſt the height be too little, leſt the ſmoke miſs its way and be choaked at firſt ſetting out. The ſame author adviſes to have an aperture through which the external air may, on occaſion, be let into the funnel, to drive up the ſmoke, which the internal air would otherwiſe be unable to do.

Some make the funnel twiſted, to prevent the ſmoke's deſcending too eaſily; but a better expedient is, to make the funnel narrower at bottom than at top, the fire impelling it up more eaſily, when contracted at the bottom; and in mounting it finds more ſpace to diſengage itſelf, and therefore will have leſs occaſion to return into the room.

Mr. Felibien directs, that the mouth of the tube, or that part joined to the chimney back, be made a little narrower than the reſt, that if the ſmoke be repelled downwards, it may be prevented from getting into the room by this obſtacle.

To prevent ſmoking chimnies, Mr. Lucas adviſes to leave two holes, or make two pipes in the chimnies, one over the other on each ſide, one ſloping upwards, the other downwards; through theſe holes or pipes, ſays he, the ſmoke will eaſily paſs out of any funnel, which way ſoever the wind blows.

Chimney-Jambs, the ſides of a chimney, ſometimes ſtanding out perpendicularly, ſometimes circularly, from the back, on the extremities whereof the mantle-tree reſts.

Chimney-Money, or Hearth-Money, a tax impoſed by ſtatute 24 Car. II. expreſſing that every fire-hearth and ſtove of every dwelling or other houſe within England and Wales, except ſuch as pay not to church and poor, ſhall be chargeable with two ſhillings per annum, payable at Michaelmas and Lady-Day, to the king and his heirs. This tax being much complained of, as burdenſome to the people, has been aboliſhed, and inſtead of it the window-tax was granted.

Chimney-Piece, a compoſition of certain mouldings of wood or ſtone, ſtanding on the fore-ſide of the jambs, and coming over the mantle-tree.

CHINA, including Chineſe Tartary, a large empire, ſituated between 95° and 135° eaſt longitude, and between 21° and 55° north latitude, being accounted two thouſand miles in length, and one thouſand five hundred in breadth; it is bounded by Ruſſian Tartary on the north, by the Pacific ocean on the eaſt and ſouth, and by Tonquin, Tibet, and the territories of Ruſſia on the weſt. It is uſually divided into ſixteen provinces, and in theſe provinces there are computed to be one hundred and fifty-five capital cities, one thouſand three hundred and twelve of the ſecond rank, two thouſand three hundred and fifty-ſeven fortified towns, and upwards of ten millions of families, which may amount to about fifty millions of people.

The principal commodities of this country are ſilk, tea, china-ware, japan-ware, and gold duſt; of all which the maritime ſtates of Europe import great quantities, ſending them ſilver in return.

China-China, in pharmacy, the ſame with quinquina. See Quinquina.

China-Root, in the materia medica, is the name of a drug, of which there are two kinds, oriental and occidental. The two plants differ little or nothing in the leaves, flowers, or ſeeds, but conſiderably in the root, and remarkably in the time of flowering; the Chineſe blowing only in June and July, whilſt the American produces flowers ſucceſſively almoſt all the year.

The root, when freſh, is fleſhy and full of juice; as brought to us, hard and woody: it is very irregular, and full of knots. The oriental ſort, which is accounted the beſt, is commonly ſhorter, thicker, leſs crooked, and leſs knotty than the American: it is alſo of a much paler reddiſh white colour on the inſide, the American being of a pretty deep reddiſh, nearly like that of biſtort: the outſide is of a reddiſh brown, a full brown, or a blackiſh. The greateſt quantities are brought over by the Dutch Eaſt-India company, in bags of one hundred and twenty-five pounds: the merchants in Batavia give the Chineſe for ſuch a bag commonly four florins, ſometimes more, at the higheſt ten.

The beſt China-root is moderately compact and heavy; when broke, not mealy or duſty, but cloſe, and of an oily or reſinous appearance. It has no ſmell, and ſcarcely any taſte, or only a ſlight kind of aſtringency.

Decoctions of this root drank freely, are ſaid to promote perſpiration and urine, and have been greatly commended in the venereal diſeaſe: they do not appear, however, to have any conſiderable virtue.

China-Ware, or *Porcelain*, a kind of ware well known in moſt parts of the world. It is formed of an artificial ſubſtance of a nature betwixt earthen-ware and glaſs. It reſiſts fuſion in the fire, when perfect, equally with the firſt; and bears, in like manner, a ſudden change with regard to heat and cold; but at the ſame time has, to a certain degree, the tranſparency, and entirely the cloſe and even texture of the latter. The pinciple on which the ſubſtance of China is formed is as follows.

There are ſome kinds of earths which, being expoſed to a ſtrong heat, will, after ſome time, fuſe or melt, and acquire the nature of glaſs; while there are others that, on the contrary, reſiſt entirely the action of heat, and remain unaltered by it, at leaſt with reſpect to that degree which can be applied by means of furnaces, or ſuch artificial fires; the firſt of theſe kinds are called vitreſcent earths, the others apyrous. Now theſe two kinds being mixed together, in due proportion, they ſo operate on each other, that a matter, endued with the properties above enumerated, is conſequentially produced: for the vitreſcent earth, though it is prevented by the other from liquifying, ſo as to become fluid, yet melts to ſuch a degree, as to make the parts of the whole co-here and gain a ſemi-tranſparency, while the other affords a body, which, not having any propenſity to melt, hinders a greater liquefaction of the whole, by abſorbing the fluid formed by the other; and gives, conſequently, a proper rigidity or ſtiffneſs to the whole maſs when hot, and at the ſame time prevents its gaining, when become cold, that vitreous grain or texture which would render it more tranſparent, as likewiſe brittle, and apt to crack or fly on any ſudden change with regard to heat or cold.

The original kind of this ware manufactured in China and Japan, was accordingly formed by a compoſition of two earths: the one vitreſcible, which is called by the Chineſe petunſe; the other apyrous, or reſiſting the action of heat, ſo as not to ſuffer itſelf to be fuſed, or melted by the heat of a furnace, at leaſt without the addition of ſome very powerful flux; and is called kaolin.

The more perfect imitations of the China ware in Europe have been, in like manner, made by the commixture of two kinds of earth. But others, where the true compoſition has not been underſtood, or the proper materials were not to be procured, have been formed of matter, prepared by mixing with the earths ſome vitreous or fluxing ſubſtances, not being duly adapted to the reſiſtance of the earth, the wares for the moſt part, (though ſome of them have been very white, and of a good conſiſtence while in the clayey ſtate for working, and capable of ſuſtaining the heat of the furnace,) have yet not been able to bear hot water, when ſuddenly poured upon them, while they are cold, without cracking or ſuffering a ſeparation of their parts.

The qualities of China ware, when perfectly good, are, to be very white and tenacious, ſo as not only to bear violence without breaking, and ſtrike fire with the ſteel as flint; but, as is ſaid before, to ſuffer boiling water to be poured on it, while it is itſelf in a cold ſtate, without being broken or cracked: to have a ſemi-tranſparent appearance; to break without ſhewing any grain in the divided parts, but ſeeming to have in them the even texture of glaſs; to ſhine on the exterior ſurface, as if a bright poliſh had been given to it: to be completely fit, while the compoſition is in the ſtate of a moiſt paſte, before it be dried or baked, to be modelled or caſt with the greateſt nicety and minuteneſs, retaining the figure, tho' wrought into the moſt thin and ſlender parts; to dry afterwards without warping; and to undergo at laſt the baking or burning, without any ſeparation of the parts or flawing. If the compoſition, or the ware formed of it, be deficient in any of theſe particulars, they are ſo far faulty: and by examining any pieces of China with regard to thoſe particulars, which relate to the finiſhed ware, the comparative or abſolute goodneſs may be eaſily diſtinguiſhed.

The baking or burning China ware is performed much in the ſame manner, as is practiſed by the potters for earthen-ware; except that it is done with more care; and that ſome expedients are uſed for defending the pieces from the injury of the ſmoke or duſt of the furnace, which would deprave the colour, or infect the ſurface with ſpecks.

The glazing the ware of this kind is a very important part of the manufacture of it; and has been generally found the moſt difficult to be performed. It is done by ſpreading ſome ſoft glaſs powdered, or ſome fluxing compoſition, (either mixed with part of the matter, of which the ware itſelf is formed, or in ſome caſes without) on the ſurface of the pieces; and melting it there, ſo as when cold to make an entire covering with the ſmoothneſs and ſhining appearance of glaſs. As the compoſition of the glazing has been generally kept a ſecret by thoſe who have the direction, almoſt every different manufactory have employed one peculiar to themſelves; and few have ſucceeded in forming ſuch as will well anſwer the end; as may be ſeen by examining the ware produced, even by the naked eye, but more diſtinctly with the aſſiſtance of a glaſs that magnifies largely; through which the ſurface will appear covered with, as it were, a net-work of an infinite number of cracks, (ſome of them frequently not ſmall) that not only impair the poliſh, but give moreover a caſt of greyneſs to the colour.

The painting and gilding China ware is much the ſame as in the caſe of enamel, except in ſome particulars; as not only the ſame compoſitions for colours ſerve equally well for both, but the manner of burning or fuſing them is alſo alike, allowing for the difference of the figures of the pieces, and the number of them generally required to be burnt together. On this part of the manufacture, the value of the ware in general moſtly depends, though it is indeed, properly conſidered, not a part of the art of making China-ware, but an auxiliary art employed only for the giving additional ornaments to it, being in fact only enamel painting applied to this purpoſe.

Compoſition for **China-ware.** The compoſition of the eaſtern or proper China-ware, according to accounts that have great marks of authenticity, is from two earths; one of which is, as was before-mentioned, vitreſcent, and is called petunſe; the other a refractory, or apyrous earth, and called kaolin.

Whether the earth, called petunſe, is formed of the ſpar of lead, (as it is properly called) uſed in the Dreſden manufactory, below ſpoken of, or whether of flints, or ſome ſpecies of ſand, (for experience has ſhewn they will all anſwer the end, when they have no tinging matter in them, and will calcine to whiteneſs) is not evident from any information hitherto brought to this part of the world. But the deſcription given of it is, that it is a very hard whitiſh ſtone, or of a grey inclining to the green.

The kaolin is clearly what we call the mica; which is a ſoft, laminated, ſhining earth, breaking into fine flakes, with the leaſt compreſſion, like the alumen plumoſum; and glittering like ſpangles, when rubbed on the hand, or any other ſmooth ſurface. This is of different colours, ſome being of the pureſt whiteneſs, and other parcels of it yellowiſh and reddiſh, and very frequently black. It is found in large beds, which appear, as it were, artificially arched over with ſtones; and is either not ſo frequently to be found as many other of the like kinds of earth, or has been unobſerved by the miners when they have met with it; perhaps from their not knowing it to be of any uſe. It was diſcovered in ſome mountains on the back of Carolina in great abundance, whither the proprietors of a work near London ſent an agent to procure it for them; but he neglected it for other purſuits: we believe no quantity has hitherto been brought from thence; and are certain there would be no occaſion to fetch it from ſo great a diſtance, if they who have occaſion for it would make diligent enquiry after it in our own country; for we have ſeen ſome that has been found in the Derbyſhire mines.

The preparation of the petunſe is by pounding the ſtone till it be reduced to a very fine powder, and then waſhing it over to bring it to the moſt impalpable ſtate; which is thus performed: After the ſtone is rendered as fine as it can by pounding, or grinding, the powder muſt be put into a large tub full of water; and being ſtirred about, the upper-part of the water muſt be laded out into another tub; by which means the fineſt particles of the powder will be carried into it. The water in the ſecond tub muſt be then ſuffered to ſtand at reſt, till the powder be ſubſided; and as much as can be laded off clear muſt be put back into the firſt tub; and there being again ſtirred about, and loaded with a freſh quantity of the moſt ſubtle part of the powder, muſt be laded again into the ſecond tub as before; and this muſt be repeated till none be left in the firſt tub, but the groſſer part of the ſtone; which, not being of a due fineneſs, muſt be again pounded, and treated as at firſt. The fine powder obtained in the ſecond tub, muſt be then freed from the water, by lading off the clear part, and ſuffering what remains to exhale, till the matter become of the conſiſtence of ſoft clay, when it will be fit to be commixed with the kaolin for uſe.

The kaolin is prepared in the ſame manner by waſhing over; but we have ſeen ſpecimens of ſuch as was ſo fine, that there was no occaſion for this or any other purification.

From theſe two mixed together, the clay or paſte is formed: but it is ſaid, that the proportion of the reſpective quantities is made to vary according to the intended goodneſs of the ware; the beſt being made from equal quantities, and the worſt from two of the kaolin to one of the petunſe. We do not ſee, nevertheleſs, any advantage ariſing from this; as at the ſame time the ware is rendered worſe, no ſaving is made, but the contrary effect produced; for we have taken it for granted, that the kaolin, or mica, is every where more ſcarce than the petunſe, or vitreſcent earth; and moreover much more fire, both with reſpect to degree and continuance, is neceſſary for the compoſition, where the proportion of vitreſcent earth is ſo ſmall, than where it is in an equal quantity with the apyrous. We are apt, therefore, to believe there has been a miſtake or omiſſion in this part of the account; and that, though the proportion of one third of the kaolin to two thirds of the petunſe may be right in the forming the compoſition for the worſe kind of China, yet the other two thirds are ſupplied by calcined flints, or ſome other more vitreſcent earth than the petunſe; which might be procured with much leſs labour and expence, and at the ſame time would require leſs force and duration of fire, than if the full proportion of petunſe were uſed.

The Saxon compoſition of the matter, of which the China-ware is formed, is greatly ſimilar to that of the eaſtern. In the place of the petunſe, a ſtone is uſed, which is improperly called in the German language, *bley ſpath*, or ſpar of lead. it is not a ſpar, but of a very contrary nature, as the ſpars are calcarious, that is, will on calcining become lime; while, on the other hand, this is of a vitreſcent nature; though it is ſaid no fire will fuſe it without ſome mixture. This ſpar is of a very hard texture, and of a light fleſh-colour, or pale whitiſh red. It is prepared by pounding and waſhing over, which may be done by the means above directed; and is then ready for compounding with the mica. The mica is employed in the Saxon compoſition for the other ingredient; and is likewiſe prepared by grinding and waſhing over, when it is not in a perfect and pure ſtate: but when it is entirely free from all foulneſs, it is only tempered with water, till the texture be thoroughly broken, and it be of the conſiſtence of ſoft clay.

The two kinds of earth being thus prepared, and in the ſtate of a ſoft paſte, they are to be incorporated, and intimately commixed together in one maſs: which is done by rolling and ſtirring them well, after they are put into the ſame veſſel; and then kneading them, by treading with the feet, till a thorough union be procured. When the compound maſs is thus formed, it is made up in cakes, or ſquare pieces, and put by layers into caſes of wood or ſtone; which muſt be placed in a moiſt ſituation, and left for two or three months, during which time a kind of putrid ferment happens in the mixture, by which the parts of the different matter combine, and form a ſubſtance with new qualities, not found in either of the kinds while ſeparate. This change ſhews itſelf by a fetid ſmell, and a greeniſh or blueiſh colour, which comes upon the whole maſs, and a tenacity or coheſion like that of clay, or the argillaceous earths moiſtened, which was wanting in the matter at its firſt mixture. If the time of keeping the paſte in this condition be prolonged for the ſpace of a year or more, it will yet improve the qualities of it; but great care muſt be taken to avoid its becoming dry; to prevent which, if there be occaſion, it is very proper to water it. When, however, the above qualities are found in the matter, it may be deemed fit for uſe; and veſſels or other pieces may be wrought of it, without any other preparation, unleſs in the caſe below excepted.

There are many other compoſitions which are, or may be, uſed for imitation of the eaſtern China-ware; but it does not appear practicable, from any other inſtance already known, to produce a matter indued with all the requiſite qualities from the commixture of earths only, without the addition of ſome fluxing or vitreous body, which may aſſiſt in giving them that tenacity and tranſparency which is neceſſary. The following compoſition however will produce wares, which will have the properties of the true China, if they be rightly managed in the manufacture.

" Take of the beſt white ſand, or calcined flints finely powdered, twenty pounds; add to it of very white pearl-aſhes five pounds, of bones calcined to perfect whiteneſs two pounds; temper the whole with gum-water, formed by diſſolving the gums arabic or ſenegal in water."

This requires a conſiderable force and continuance of heat to bring it to perfection; but will be very white and good when it is properly treated. Where mica can be obtained, it is preferable to the calcined bones; and as it will form a paſte of kindly texture for working, a weaker gum-water will ſerve; the neceſſity of uſing which at all, in this kind of compoſitions, is occaſioned only by the want of proper coheſion and tenacity in the paſte, which ſuch mixtures make.

" Take of the beſt white ſand, or calcined flints finely powdered, twenty pounds; of very white tobacco-pipe clay, or the Corniſh ſope rock clay waſhed over, five pounds; and of the whiteſt pearl-aſhes, four pounds: temper them with a weak gum-water." Or,

" Take of the whiteſt ſand, or calcined flints finely powdered, twenty pounds; of flint, or any other colourleſs glaſs, powdered alſo, ten pounds; and of mica, or calcined bones, two pounds: temper them with gum-water ſufficiently ſtrong, to give them a due coheſion."

There have been ſeveral ſimilar compoſitions uſed for the imitation of China-ware in the works ſet on foot in different parts of Europe: and among the reſt, we have ſeen at one of thoſe carried on near London, eleven mills at work, grinding pieces of the earthern China, in order, by the addition of ſome fluxing or vitreous ſubſtance, which might reſtore the tenacity, to work it over again in the place of new matter. The ware commonly produced at this manufactory had the characters correſpondent to ſuch a mixture; for it was grey, full of flaws and bubbles; and from want of due tenacity in the paſte, wrought in a very heavy clumſy manner, eſpecially with regard to thoſe parts that are to ſupport the pieces in drying. A very oppoſite kind is produced in another manufactory in the neighbourhood of London; for it has great whiteneſs, and a texture that admits of its being modelled or caſt in the moſt delicate manner; but it is formed of a compoſition ſo vitreſcent, as to have almoſt the texture of glaſs; and conſequently to break or crack, if boiling water be ſuddenly poured upon it; which quality renders it unfit for any uſes but the making ornamental pieces. The works at Dreſden and St. Vincennes in France may, therefore, be eſteemed the only manufactories in Europe, advanced as yet to any degree of perfection; though there are no particular advantages in the ſituation of either of them, that give them any claim to the monopolizing this art: and we may, therefore, hope to ſee ourſelves in time as much maſters of this as of all the other manufactures duly cultivated and encouraged with us.

Manner of Formation of Veſſels, Figures, Flowers, or other Pieces of CHINA-WARE. The various kinds of pieces of China-ware are formed by three methods, turning, caſting, and modelling: the particular manner of doing which being the ſame in this caſe as in others, there will be little occaſion to be explicit with regard to it.

Larger veſſels are generally turned in the ſame manner as is practiſed by the potters for ſtone or earthen-ware: but where they are intended to be of very nice and accurate figure, after they have the general form given to them, they are finiſhed by putting them into proper moulds.

Figures, as alſo pieces, or ornaments of pieces, of the nature of baſs relief, are commonly caſt in moulds, which is done in the ſame way as plaſter of Paris is treated; for which directions will be found under the article CASTING. But ſome detached parts of ornaments, where no great preciſion of form is required, may be beſt modelled or worked by the hand.

Flowers, and other ſuch looſe deſigns, where latitude may be given to the fancy, are alſo moſt commodiouſly modelled or wrought with the hand, with the help of a ſmall ſtick flattened at the point, a pair of pliers, and a wet ſponge.

Where the parts of the pieces are very ſlender and thin, as particularly in the caſe of flowers, if the paſte be not of itſelf of a very tenacious conſiſtence, it ſhould always be brought to a proper ſtate of coheſion, by tempering it with gum-water: for the want of knowing which expedient, we have ſeen very coarſe work done with great labour, and ſubject to frequent miſcarriages, where the whole difficulty might have been eaſily ſurmounted by this means.

Firſt baking or hardening the CHINA-WARE. The pieces being formed according to the manner above directed, muſt be gradually dried till they are capable of bearing heat without cracking: and they muſt be then baked for the firſt time, in order to give them a due hardneſs to bear the glazing. This baking is performed in the following manner: but before we proceed to the further particulars, it is proper to deſcribe the apparatus neceſſary for it.

The furnace for baking the China-ware may be conſtructed in the ſame manner as the potter's kilns are uſually built; and Windſor bricks, with mortar of Windſor loom, or Sturbridge clay, ſhould be employed in its fabrication; or where they are not to be procured, ſuch bricks and clay as moſt reſemble them in their qualities. The magnitude of this furnace muſt be according to the quantity of ware that is to be baked in it; but it ſhould not be too ſmall, becauſe the body of fire may otherwiſe not be ſufficient to produce the effect.

The caſſettes or coffins in which the pieces are put, when placed in the furnace to be burnt, are the next utenſils. They ſhould be of Sturbridge or other good potter's clay, with a third of ſand; and are generally made of a round form, with a flat bottom; the rim, forming the ſides, being adapted to the height of the pieces they are intended to contain. They ſhould be all of the ſame magnitude, as to diameter, that one may ſtand on the other, when they are ſet into the furnace, in order to their being piled one above another, as high as the furnace will admit: and a cover muſt be made for cloſing the uppermoſt. Theſe caſſettes may be beſt made by turning, or on occaſion they may be formed in a mould.

The furnace and caſſettes being prepared, the pieces of ware to be baked muſt be diſpoſed in the caſſettes, according to the moſt advantage; and then as many caſſettes muſt be ſet one upon the other in the furnace, as it will commodiouſly contain, leaving room for the fire to have free paſſage betwixt the piles, and taking care to put the cover over the uppermoſt caſſettes in each pile. The mouth of the furnace muſt then be cloſed; and the fire muſt be kindled, which ſhould be of wood, and augmented at firſt by ſlow degrees; after which it ſhould be raiſed ſo as to heat the caſſettes red-hot in every part of the furnace, and continued in this ſtate for twelve or fourteen hours. It ſhould then be ſuffered to extinguiſh, and the furnace left to cool gradually; and, when little or no heat remains, the mouth may be opened, and the pieces taken out of the caſſettes, and they will be in a condition to receive the glazing, or to be painted with ſuch of the colours as are uſed under the glazing.

Compoſition for, and Manner of glazing, CHINA-WARE. The glazing of the China-ware, as was obſerved before, is one of the moſt important, and moſt difficult operations in the whole art of the manufacture; and is, indeed, the moſt imperfectly practiſed of any, with reſpect to that of the original eaſtern China. The method uſed by the Chineſe is however ſaid, on very good authority, to be as follows.

They take the fineſt pieces of the petunſe, and heat them as is before-mentioned, by pounding and waſhing over: but extract, by repeated waſhings over, the very fineſt part of the powder, which, keeping ſo moiſt with the water, that the mixture forms a liquid maſs, they call the oil of petunſe: with this oil they mix an equal weight of borax. They then quench a quantity of quicklime, and form layers of that and dried furze, which they ſet on fire when they have raiſed a large heap: when the firſt heap is burnt to aſhes, they collect them and the lime, and form layers of them again, with a freſh quantity of the furze, which they burn as before; and they repeat this five or ſix times: they then put the aſhes and lime into a veſſel with water, adding ſome borax in the proportion of one pound to a hundred weight of the aſhes; and they waſh over the finer part of the mixture, and pour off, at laſt, all the fluid from the dregs, which they keep together with the ſolid part waſhed over. They mix this compoſition of lime, aſhes, and ſalts, with an equal quantity of the oil of petunſe and borax: which compoſition forms the matter for glazing the ware.

Inſtead of the petunſe, the ſpar of lead uſed in the Saxon manufacture may be employed for forming a ſimilar glazing, being treated in the ſame manner: and it is ſaid the glazing of the Dreſden china is actually made in the ſame way. We queſtion, however, that fact; and believe the real compoſition is a ſecret, which has not hitherto tranſpired: but if we cannot impart the method uſed there, with ſo much authenticity as we could wiſh, we will however communicate one uſed in another conſiderable manufactory, which excels the Dreſden in this particular.

“Take of the fineſt white ſand, or calcined flints, twenty pounds; of red lead eighteen pounds; of pot-aſhes ten pounds; and of common ſalt decrepitated four pounds. Fuſe this mixture in the manner practiſed in the treatment of glaſs, till it be perfectly vitrified, and then having ſeparated the fragments of the pot carefully from it, reduce it in a flint, agate, or porphyry mortar, to an impalpable powder; and then temper it with water to the proper conſiſtence for painting.”

When this glazing is to be uſed for any emboſſed, or other fine work, it ſhould be mixed with a third of its weight of the ſpar of lead, or other vitreſcent earth, uſed in the place of the petunſe, in the compoſition of the paſte of which the ware is made, taking care that ſuch earth be formed of the beſt pieces of the ſpar, or other ſubſtance uſed; and that it be rendered of an extreme fineneſs, by waſhing over. The deſign of this addition is to weaken the fluxing power of the glazing; which, if uſed alone, would run the corners and edges of the ſmaller parts; and impair the ſharpneſs and ſpirit of the work. It is neceſſary, likewiſe, to purſue the ſame method, in the caſe of pieces that are to be painted with deſigns of a more delicate kind: for the glazing, melting otherwiſe again in the burning in the colours, would become too fluid, and ſpread them ſo as to take away the effect of the fine touches.

The compoſition for glazing, of which kind ſoever it be, thus prepared and tempered to a due conſiſtence, muſt be laid on the pieces of the ware, after the firſt baking, and after ſuch of them as are to be coloured under the glazing have been painted. This muſt be done with a proper bruſh, or with pencils, if there be emboſſed work or hollows; the greateſt care being taken to ſpread it evenly on every part of the ſurface, and not to fill or load the hollow parts, which are very apt to collect more than their due proportion from the bruſh. The compoſition ſhould be laid on the ware of the thickneſs of two ſheets of writing paper, which, in caſe of nicer kinds of emboſſed works, is beſt done in two or three different coats, giving time for the one to be nearly dry, before the other be laid on. When the pieces are thus covered with the matter of the glazing, they are ready for the ſecond baking or burning.

Second Baking or Burning of the CHINA-WARE. The pieces of ware being glazed, muſt undergo a ſecond baking or burning, in order to their due vitrification and hardening; the firſt being only to give them a proper tenacity and firmneſs to bear the laying on the glazing: but this operation being performed in a furnace of a different ſtructure from the other; and which it is therefore proper to deſcribe in this place, we ſhall give directions for the conſtruction of it, before we proceed to ſpeak further of its uſe.

This furnace is compoſed of four ſeparate cavities, one above the other: the firſt of which ſerves as an aſh-hole, and for the conveying the air to the fewel through the bars: the ſecond for a repoſitory for the fewel: the third as an oven or kiln for receiving the ware that is to be burnt: and the laſt as a vent for the ſmoke, in order to preſerve a communication with the chimney, and at the ſame time ſpread the flame and heat equally on all the piles of caſſettes placed in the cavity under it. In order to erect ſuch a furnace, the following method muſt be purſued: but the dimenſions of the whole furnace may be varied, where there is occaſion; adhering, nevertheleſs, to the ſame proportions.

The ground plan muſt be firſt marked out, of ſuch figure and extent, that it may allow of an oval cavity, of which the larger diameter is ſix feet, and the leſſer four feet and a half; ſurrounded with a proper wall of the thickneſs of one brick and a half. The area of this incloſed ſpace being marked out, the ground muſt be dug away within the circumſcribed ſpace, till a hole of the ſame figure and dimenſions, and with a level bottom, be made, of the depth of nine or ten inches below the level of the place. In the front of this hole a furrow or trench muſt be alſo dug, of about a foot wide, and ſloping gradually from the level ground of the place to the bottom of the hole: and it ſhould alſo be lined at the bottom and ſides with bricks or tiles, for keeping the earth from breaking into it. The foundation of the brick-work muſt then be laid, by raiſing, within the hole, a wall round the ground, which circumſcribes it, of the thickneſs of one brick and a half; diſcontinuing the round, nevertheleſs, in the part where the furrow or trench enters. This wall may be built of common bricks, pointed with mortar made of lime and ſifted aſhes; and may be carried up to the height of three or four inches above the common level of the ground of the place; and then a ſtrong frame with iron bars, for ſupporting the fewel, muſt be fixed, bearing ſufficiently on the brick-work. A door and frame muſt likewiſe be placed in a proper poſition in the front of the furnace, for putting the fewel upon the bars; after which, the brick-work may be again proceeded with, in the ſame manner as before, till it be a foot or fourteen inches above the bars. A roofing ſhould be then formed of, as it were, ſeveral arches, ſo as to give as much opening as poſſible into the cavity where the caſſettes with the ware are to be placed; and at the ſame time furniſh a proper flooring for ſupporting them: to which end the inequality of the ſurface formed by theſe arches on their upper-ſide muſt be taken away, by filling up the hollow part till a level be obtained, and the flooring ſo formed be, as it were, a grate of brick-work. The wall of the furnace muſt then be carried up ten feet, in the ſame dimenſions and figure as at firſt; but this part requires only to be of one brick thickneſs, and muſt have an opening in front ſufficiently large to ſuffer the caſſettes to be put in and piled upon each other; as alſo another ſmaller opening for looking into the furnace, and taking out ſmall pieces, placed within reach, to ſerve as proofs for examining the progreſs of the operation, in order to judge when it is perfected. This principal chamber, or cavity of the furnace, muſt be terminated by a dome of the brick-work, perforated in ten or twelve places, to afford ſo many vents to the ſmoke; of which three muſt be placed in the middle, in a triangular ſituation: theſe vents or holes muſt have regiſters or ſtopples of baked clay fitted to them, in order that any of them may be ſtopped when the draught of the fire ſeems unequal, and one ſide of the furnace has more heat than the other. Over this arched cavity muſt be raiſed another of about four or five feet in height; which may be formed by containing the oval-figured wall of the furnace, and ending it by another dome of brick-work: into this cavity an opening muſt be made like the mouth of an oven, ſufficiently large to admit of the ſtoppers or regiſters of the vents or openings into it from below being taken out, and put in occaſionally, by means of a proper pair of tongs. In the middle of the dome the chimney muſt be formed, by carrying up a tube or funnel of very ſlight brick-work, of the diameter of about ſix inches, and the height of about three feet; or, inſtead of brick-work, this tube or funnel may be made of the red earthen-ware, which is at preſent frequently applied to ſuch purpoſes near London; and will be a much leſs load to the furnace than brick-work, though ever ſo ſlight. A regiſter, which may be made by a ſliding plate of iron, ſhould alſo be placed at the vent into this chimney, that it may be cloſed up, when neceſſary, and all draught or communication betwixt the external air and the furnace prevented. The whole of the furnace above the bars for bearing the fewel, except the uppermoſt dome and the chimney, ſhould be built of Windſor bricks, and mortar formed of Windſor loom or Sturbridge clay; or, where they are not to be had, of ſuch other kinds as will beſt bear the force of the heat: and it would be a great advantage likewiſe to point the chamber, where the fewel is contained, as likewiſe the arch-work and flooring over it, with the fire flute.

The manner of baking or burning the China-ware in this furnace, is by putting the pieces as before in caſſettes, and raiſing piles of the caſſettes in the kiln, or principal chamber of the furnace, one over another, till the furnace be as full as it can well bear to be, leaving room for the fire to paſs betwixt the piles, and play round them, as alſo to vent itſelf properly through the openings of the dome at the top. Some ſmall pieces muſt be likewiſe put in as proofs, which ſhould be repoſited in a caſſette, that has an opening in the ſide of it, which muſt be placed near and oppoſite to the opening of the chamber before directed to be made for examining theſe proofs. When the whole is thus properly adjuſted within the furnace, the openings into the principal chamber, as likewiſe that into the upper one for venting the ſmoke, muſt be cloſed, by walling up the large one, and luting a fire-ſtone adapted to the figure of them in the two ſmaller: the fire muſt then be kindled, and kept at firſt low, increaſing it only a few degrees for twenty four hours; after which it muſt be augmented, from hour to hour, till it be raiſed to the higheſt degree that the furnace will admit of; and in that ſtate it muſt be continued for ſix hours; by which time, if the compoſition of the paſte were good, the ware will be vitrified to the proper degree, and attain all the qualities above-mentioned to be requiſite. But to be certain of this, it is proper to examine the proofs, which, if found to be ſatisfactory, the fire ſhould be ſuffered to decay, and after ſome hours, all the openings into the furnace, and communications with the external air, ſhould be effectually cloſed and ſtopped up, to prevent the cracking, as well of the caſſettes, as the ware they contain, on their becoming cold: and in this condition the furnace ſhould remain till the whole be perfectly ſo; for which two or three days may be allowed. The ware may be then taken out, and will be fit for painting, where it is intended to be ſo ornamented: but that there may be a greater certainty of ſucceſs, it is neceſſary, in conducting the operation, to obſerve, attentively, whether the flame and heat, before deſcribed, ſpread themſelves equally and duly in all the parts of the furnace: and if one ſide appear hotter than the other, from an irregular diſtribution of the draught of the furnace, one or two of the vents, placed in a triangular manner in the dome of the chamber, muſt be cloſed, that the flame may be determined to paſs in a greater proportion up the other ſide of the furnace; and if this do not ſuffice, ſome of the other vents may be likewiſe cloſed. It ſhould be alſo obſerved, to keep the fire as much as poſſible of one regular pitch; allowing, nevertheleſs, for the gradual augmentation; as otherwiſe, if it be alternately ſunk, and raiſed, it will be impracticable to form any effectual conjecture, with reſpect to the time required for completing the operation.

Painting and gilding the CHINA-WARE. There are two methods of treatment of the China-ware, with reſpect to the painting: the firſt is, to lay on the colour under the glazing; the other, over it. The firſt is the moſt expeditious, becauſe it prevents the trouble and expence of a third burning; the ſecond fully anſwering the purpoſe of fluxing the colour. But the painting before the glazing be laid on is only practicable with reſpect to blue, and the browniſh or foul ſcarlet red, which is ſeen along with the blue ſo frequently in the Oriental china; the other colours being too tender to bear ſo long a duration of heat, and the fluxing power of the glazing, without flying or ſpreading themſelves out of their proper bounds.

The painting, therefore, thus made under the glazing, muſt be performed by laying on the colours after the firſt baking: and for blue may be either ſmalt finely levigated; or for darker teints, zaffer vitrified with borax in the following manner.—"Take of white ſand, or calcined flints, three parts; of calcined borax, of pearl-aſhes, and of zaffer, each of one part: grind them well together; and then fuſe them till the maſs be perfectly vitrified; when levigate them a ſecond time, and they will be fit for uſe." For the red, calcined iron, or crocus martis, may be uſed: and the calcined iron may be mixed with an equal part of any tranſparent white glaſs reduced to an impalpable powder. Theſe colours, as the painting in this caſe is ſeldom intended to be performed with great nicety, may be tempered with water, and laid on with a pencil, as in other caſes, but as thinly as poſſible; becauſe, otherwiſe, in putting on the glazing, it will be liable to ſpread, and ſtain the white near it.

The painting, where other colours are uſed, being laid over the glazing, muſt conſequently be done after the ſecond baking: but as there is not the leaſt difference betwixt this and other enamel painting, either with reſpect to the choice or treatment of the colours, it is unneceſſary to enlarge on any particulars here.

The gilding China-ware is moſtly performed by means of the precipitation of gold made with copper; which is tempered with oil of ſpike, and laid on with a pencil, either before the glazing be put on, or along with the colours over the glazing, if it be intended to be burniſhed. When the gilding on China-ware is to be burniſhed, it muſt be done after the laſt burning, by rubbing with a burniſher of jaſper or agate, till a ſufficient poliſh be obtained.

CHIN-COUGH, a convulſive kind of cough, which children are chiefly ſubject to, proceeding from a tough, viſcid, and acid matter, lodged in the coats of the ſtomach, which when they vomit, they are eaſy for a time.

Sometimes this diſorder proceeds from a more dangerous cauſe, which is a certain ſalt communicated to tender bodies by means of the air, which coagulates the lymph, and, which growing ſharp and ſtagnating, affects the larynx.

In the cure of this cough, particular care ſhould be had to the ſtomach; and without a vomit the cure can hardly be effected. Spermaceti in broth is of excellent uſe: but by bleedings and repeated purges this cough may be cured, without other means: yet the milder cathartics ought here to take place. Drinks and liquid aliments ſhould alſo be taken in leſs quantity than uſual.

CHINE, in the manege, the ſame with a horſe's backbone.

CHINESE, ſomething belonging to the empire of China, or its inhabitants.

CHINESE *Philoſophy*. The Chineſe are univerſally allowed to have ſurpaſſed all other nations of India, in their antiquity, learning, politeneſs, the improvement of the ſciences, a taſte for philoſophy, and their political principles. And, according to ſome eminent authors, they may diſpute the pre-eminence, in theſe particulars, even with the politeſt nations in Europe.

If credit be given to theſe authors, the Chineſe had philoſophers in the firſt ages of the world. A plan of ſublime morality was current among them ſoon after the flood. Iſaac Voſſius, Spezelius, and a crowd of miſſionary jeſuits, who have travelled into China to propagate Chriſtianity, have given us this account of them: others, as Budæus, Thomaſius, &c. ſpeak leſs favourably of the Chineſe. The only method therefore of coming at the real truth is to take a ſhort review of the writings aſcribed to them; but unhappily it is a matter of doubt whether theſe are authentic, and the exactneſs of the tranſlation is alſo very much diſputed.

The collection publiſhed at Paris in 1687, by the fathers Intorcetta, Hendric, Rougemont, and Couplet, preſents us with the Ta-hio or Scientia magna; a work of Confucius, publiſhed by his diſciple Cemcu. The Chineſe philoſopher in this work propoſes to teach princes the art of governing well; which he makes to conſiſt in that of knowing and acquiring all the qualities neceſſary for a ſovereign; ſuch as to command himſelf, to know how to form his council and court, and bring up his family in a proper manner.

The ſecond work in this collection is intitled Chumyum, or, de Mediocritate in rebus omnibus tenenda, the golden mean; but contains nothing more than may be met with in Seneca's Morals.

The third is a collection of dialogues and apophthegms concerning vices, virtues, moral duties, and good behaviour, intitled Lun-yu.

The learned editors promiſed the public the works of Mencius, a Chineſe philoſopher, which Francis Noel, a miſſionary of the ſame company, performed in 1711, by publiſhing ſix Chineſe claſſics, in which are contained ſome fragments of Mencius. We ſhall not enter into the diſputes which theſe collections have raiſed among the literati, with regard to their authenticity.

The Chineſe chronology and philoſophy are not very conſiſtent. Fohi, the founder of the empire of China, reigned, according to them, in the 2954th year before Chriſt. The Chineſe cycle begins in the 2647th year before Chriſt, the eighth year of the reign of Hoangti. Hoangti's predeceſſors were Fohi who reigned 140 years, and Xinung who reigned 110 years. But, to follow the ſyſtem of Petavius, the birth of our Saviour falls in the year of the world 3889, the deluge in 1656; from whence it follows that Fohi reigned ſome ages before the flood: ſo that we muſt either give up the chronology of the ſacred writings, or that of the Chineſe. Neither a Chriſtian, nor a ſenſible European, will heſitate a moment which to prefer, when he reads in the Chineſe hiſtory, that Fohi's mother was impregnated by the rainbow, and a thouſand other ſuch extravagant ſtories, which make the epoch of his reign uncertain, notwithſtanding the unanimous teſtimony of a nation.

In whatever age Fohi reigned, he ſeems to have been rather an Orpheus or Hermes, than a great philoſopher or learned divine. For they tell us he invented the alphabet, two inſtruments of muſic, one of twenty-ſeven, the other of thirty-ſix ſtrings. They aſſert the book Ye-kim, attributed to him, contained the moſt profound ſecrets; that he taught the people, whom he had civilized, the exiſtence of a God, and the manner in which he ought to be worſhipped.

This Ye-kim is the third of the U-kim, or collection of the moſt ancient writings among the Chineſe: it is compoſed of whole lines and hemiſtichs, or rather lines ſtopped at different lengths, the combination of which exhibits ſixty-four different figures. The Chineſe looked on theſe as an emblematic hiſtory of nature, the cauſes of its phænomena, the ſecrets of divination, and of many

other

other ſublime ſciences, till Leibnitz decyphered the ænigma, and demonſtrated that Fohi's two lines were only the elements of binary arithmetic.

The emperor Fohi tranſmitted his philoſophy to his ſucceſſors. They applied themſelves to improve what he had begun, to civilize the manners of the people, and accuſtom them to the uſeful bonds of ſociety. Xin num went a ſtep farther; he taught agriculture, the virtues of plants, and the firſt attempts in the art of medicine. It is uncertain whether the Chineſe at that time were idolaters, atheiſts, or deiſts. Thoſe who pretend to prove they admitted the exiſtence of a God, from the ſacrifice Ching-tang made in the time of a famine, ſeem to want ſufficient grounds for the ſupport of their aſſertion.

The philoſophy of the kings of China ſeems to have been for a long time entirely political and moral, if we may form a judgment from the maxims of their kings Yao, Xum, and Yua. This collection is intitled U-kim, the firſt book of which, called Xu-kim, contains theſe maxims. The ſecond book, called Xy-kim, is a collection of moral poems and odes. The third is Fohi's lineary work already mentioned. The fourth is the Chum-cieu, or ſpring and autumn. This is an hiſtorical abridgement of the lives of ſeveral of their princes, wherein their vices are not concealed. The fifth is the Li-ki, which is a kind of ritual, to which was joined an explanation of what ought to be obſerved in ceremonies, profane and ſacred, and the duty of man in all ſtations of life, under the reign of the three imperial houſes, Hia, Xam, and Cheu. Confucius boaſted that he drew from the writings of the ancient kings, Yao and Xum, the moſt ſublime ſcience and greateſt wiſdom.

The U-kim is the moſt ſacred, authentic, and moſt reſpected literary hiſtory in China. We may look on the reigns of their kings, who were philoſophers, as the firſt age of the Chineſe philoſophy. The ſecond age which we are now entering upon, begins with Rooſi, or Li-lao-kiun, and ends with the death of Mencius. China had many philoſophers of note, long before the time of Confucius. Particular mention is made of Rooſi, Li-lao-kiun, or Lao-tan, who was born 346 years after Xekia, or 504 before Chriſt, at Sokoki in the province of Soo. They tell you he was an adept in the knowlege of the gods, of ſpirits, the immortality of ſouls, &c. Till this period the philoſophy of the Chineſe was only moral. But now metaphyſics, a number of ſects, and various opinions, ſtarted up.

Confucius ſeems not to have greatly cultivated this philoſophy, but held that of the firſt kings in higher eſteem. He was born 451 years before Chriſt, at the village of Ceu-ye, in the kingdom of Xantung. His family was illuſtrious, and, according to the Chineſe, his birth miraculous, for they tell us that celeſtial muſic was heard round his cradle; that two dragons gave him pap; that at ſix years of age he arrived at the ſtature of manhood and gravity of old age. At the age of fifteen he applied himſelf to the ſtudy of literature and philoſophy. He was married at twenty, and his merit raiſed him to the higheſt preferment; but the luxury of a voluptuous and debauched court was diſagreeable to him, and he to the court. Being diſmiſſed from his employment, he retired into the kingdom of Sum, where he opened a ſchool of moral philoſophy, and had many diſciples, who were men of ability, and honeſt citizens. His philoſophy conſiſted more in deeds than words, in actions than expreſſions. His diſciples reverenced him when alive, regretted him when dead, and held him in ſo great veneration, that they inſtituted a kind of ſacrifices to his memory.

It is very difficult to determine whether Confucius was the Anaxagoras or Socrates of China, as the anſwer to this queſtion depends on a great knowledge of the language; but it is plain from the account we have given of his principal works, that he applied himſelf more to the ſtudy of humanity and morality than to the ſtudy of nature and its cauſes.

Mencius appeared in the next age. We ſpeak of this philoſopher next, becauſe Rooſi, among the Japaneſe, is the ſame with Li-lao-kiun among the Chineſe, whom we have mentioned before. Mencius has the reputation of having been ſuperior to Confucius in ſubtilty and eloquence; but at the ſame time is owned to be much his inferior, with regard to moral rectitude and ſimplicity of heart. All kinds of literature and philoſophy were almoſt extinguiſhed by Xi-hoam-ti, who reigned about three ages after Confucius. This prince, who was jealous of the glory of his predeceſſors, an enemy to men of learning, and an oppreſſor of his ſubjects, cauſed all the writings he could collect to be burned, except thoſe wrote on agriculture, medicine, and magic. Four hundred and ſixty ſages, who had retired to the monntains, with what part of their libraries they could carry along with them, were taken and expired in the flames, with the books they had preſerved: near as many, who were confined in an iſland by the orders of this prince, fearing the ſame fate, choſe to throw themſelves from precipices into the ſea. The ſtudy of literature was prohibited by ſevere penalties, and the books that remained were diſregarded, and not looked into, till the princes of the race of Han ſet about the revival of learning, when it was with difficulty they recovered ſome of the works of Confucius and Mencius. They found a copy of Confucius buried in the ruins of a wall, but this copy was half rotten; and it is from this mutilated copy that his works now extant are taken.

The revival of learning may ſerve for a date of the third period of the ancient Chineſe philoſophy.

The ſect of Foe then ſpread all over China, and, with it, idolatry, atheiſm, and ſuperſtition of all kinds; ſo that it is uncertain whether the ignorance, into which the brutality of Xi-hoam-ti had plunged theſe people, was not preferable to the falſe doctrines they were now infected with.

Three centuries after the birth of Chriſt, a ſect prevailed throughout the empire of China, who imagined themſelves more perfect by being inactive, and thought they reſembled the aerial beings more, by their inert philoſophy. Theſe, as much as in them lay, forbad the natural uſe of the ſenſes. But this ſect grew into diſrepute on the appearance of the Fan-chin; a ſort of Epicureans, who appeared in the fifth century, and maintained that virtue, vice, providence, immortality, &c. were only arbitrary terms, without a meaning. This philoſophy is unhappily too palatable not to be received by the bulk of mankind, and is ſo much the more dangerous, as it becomes more univerſal.

The middle age of the Chineſe philoſophy commences about the tenth or eleventh century, under the two philoſophers Cheu-cu and Chim-ci. Theſe according to ſome were polytheiſts; according to others atheiſts. The ſect of literati immediately followed thoſe of Cheu-cu and Chim-ci. This ſect, under the name of Ju-kiao, divides the whole empire with the ſects Foe-kiao and Lao-kiao, which are in truth no other than three different combinations of ſuperſtition, idolatry, polytheiſm, and atheiſm.

At length the Europeans carried our ſciences into the Eaſt; and this event is the epocha of the modern philoſophy among the Chineſe. The ſingular eſteem with which they honoured the firſt Europeans who travelled into China, give us no very high idea of their ſkill in mechanics, aſtronomy, and other parts of the mathematics. Theſe Europeans were not men of any diſtinguiſhed merit, but ſuch whom zeal carried thither, to propagate the Chriſtian religion at the hazard of their lives, in unknown regions, which indeed beſel ſome of their ſucceſſors. They were well received by the Chineſe; ſuperſtition, apt to take offence and be alarmed, gave them no oppoſition; they opened ſchools, had many diſciples, and their learning was admired. The emperor Cham-hy about the end of the laſt century admitted them at court, learned our philoſophy and ſciences of them, ſtudied mathematics, anatomy, aſtronomy, mechanics, &c. but his ſon Yong-Tching baniſhed all the European virtuoſi to Canton and Macao, except thoſe that reſided in Pekin, who were ſuffered to continue in that city. Kien-Long, the ſon of Yong-Tching, ſhewed a little more indulgence to the learned of Europe; but forbad them to preach the Chriſtian religion, and even perſecuted his ſoldiers who had embraced it; though at the ſame time he permitted the Jeſuits to continue their inſtructions at Pekin.

CHIO-PEAR, the name of a ſpecies of pear, of a yellowiſh colour, and ſtreaked with red.

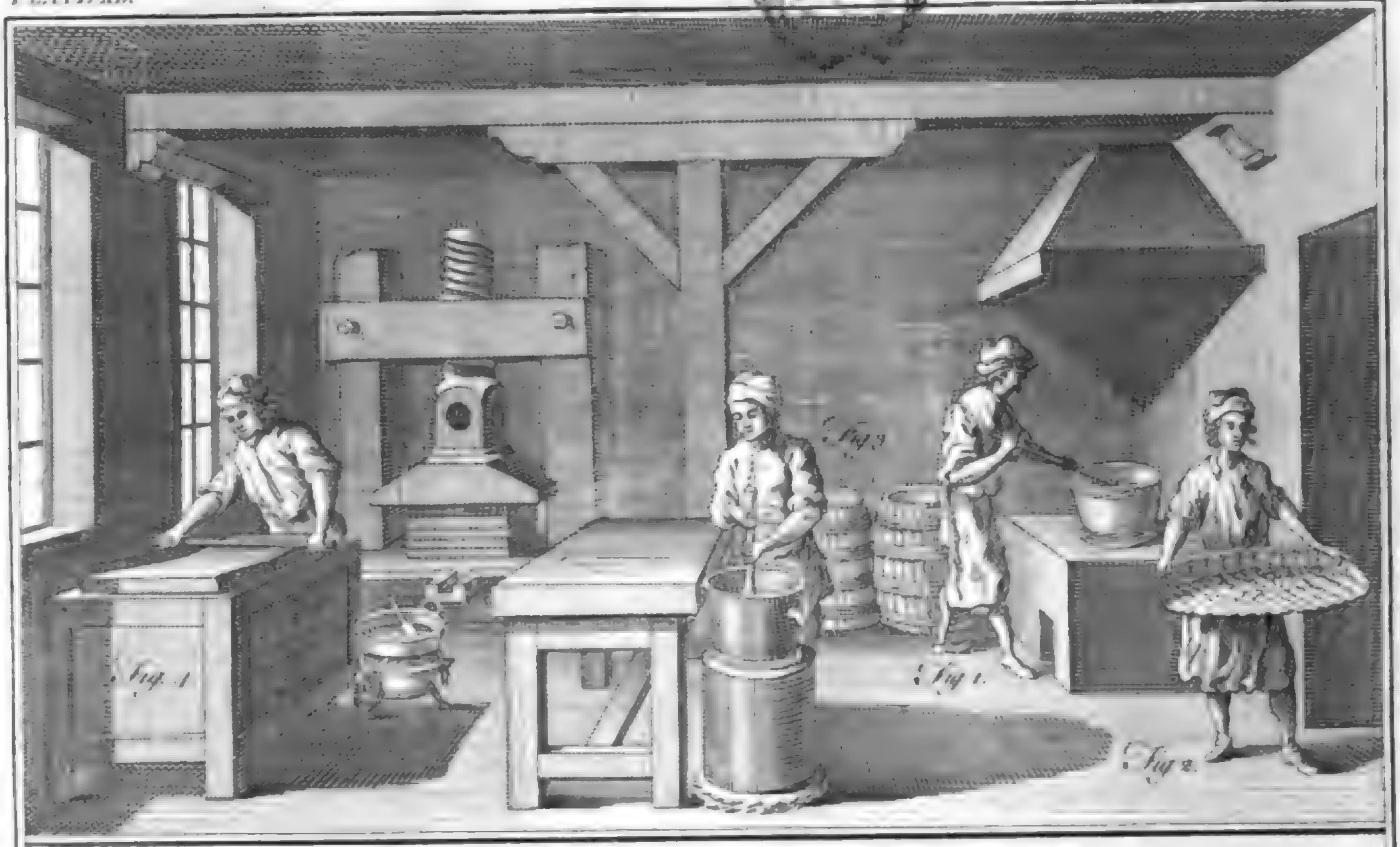


Fig. 4
Fig. 3
Fig. 1
Fig. 2

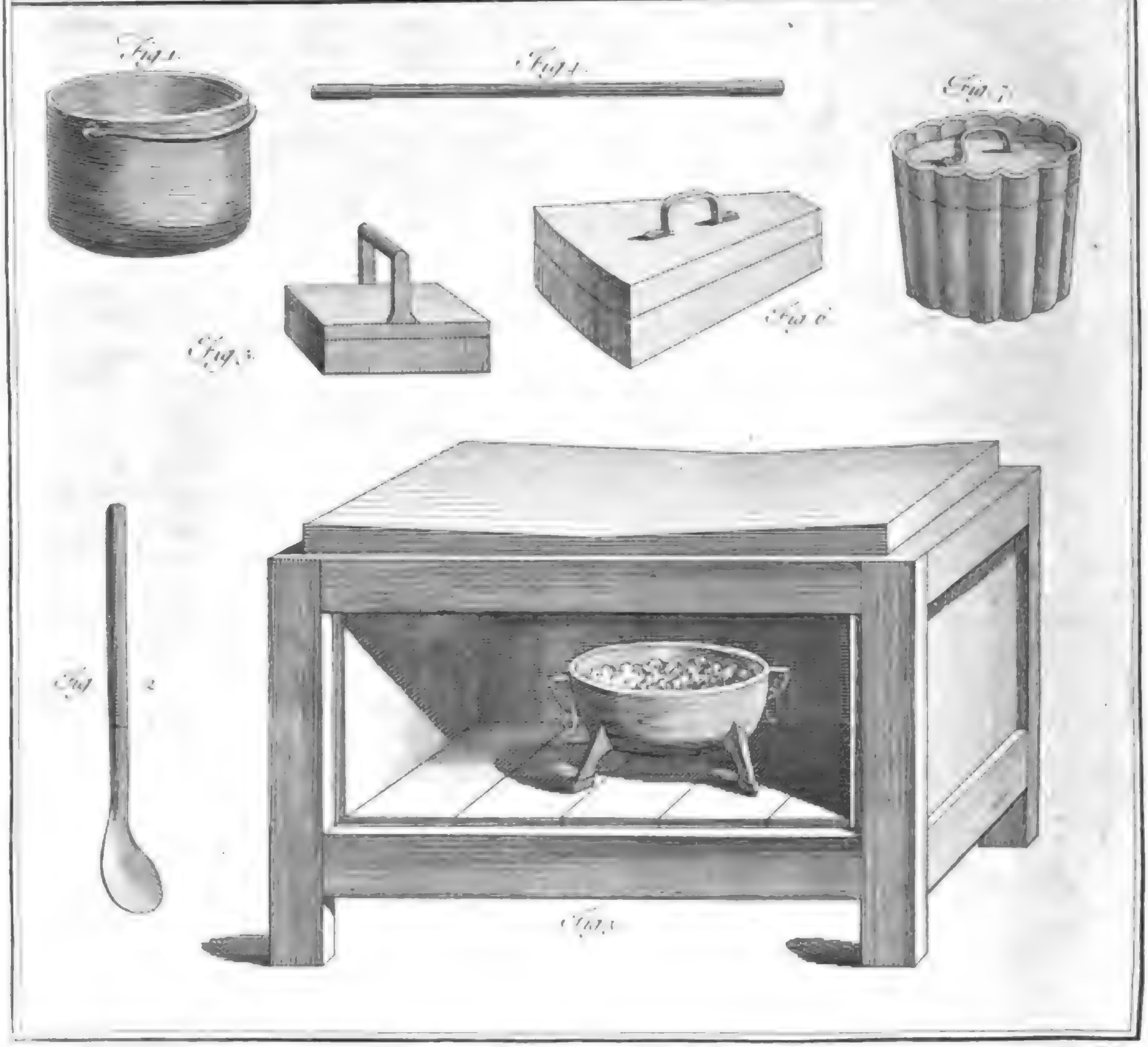


Fig. 1.
Fig. 4.
Fig. 7.
Fig. 3.
Fig. 6.
Fig. 2
Fig. 5

Hodge sculp.

CHIONANTHUS, ſnow-drop-tree, in botany, a genus of plants, the corolla of which conſiſts of a ſingle petal, and is divided into four parts; the tube is very ſhort, no longer than the cup, and is petalous; the limb is divided into four extremely long ſegments, which are erect, acute, of a linear figure, and ſomewhat uneven; the fruit is a roundiſh unilocular berry, containing a ſingle ſtriated officle for ſeed.

CHIRAGRA, in medicine, a term uſed to denote the gout in the hand or wriſt. See the article GOUT.

CHIROGRAPH, *Chirographum*, in the time of the Saxons, ſignified any public inſtrument of gift or conveyance, atteſted by the ſubſcription and croſſes of witneſſes.

CHIROGRAPH was alſo anciently uſed for a fine: the manner of engroſſing the fines, and cutting the parchment in two pieces, is ſtill retained in the chirographer's office.

CHIROMANCY, χειρομαντεια, a ſpecies of divination, drawn from the different lines and lineaments of a perſon's hand; by which means, it is pretended, the inclinations may be diſcovered.

CHIRONIA, in botany, a genus of plants; the corolla is formed of a ſingle petal, and is equal; the tube is roundiſh, and of the ſize of the cup; the limb is divided into five equal oval ſegments, and patent; the fruit is of an oval figure, and contains two cells; the ſeeds are numerous and ſmall.

CHIRONIA is alſo uſed by ſome for the black bryony, or tamnus. See the article TAMNUS.

CHIRONOMY, *Chironomia*, in antiquity, the art of repreſenting any paſt tranſaction by the geſtures of the body, more eſpecially by the motions of the hands. This made a part of liberal education; it had the approbation of Socrates, and was ranked by Plato among the political virtues.

CHIROTONY, *Chirotonia*, among eccleſiaſtical writers, denotes the impoſition of hands uſed in conferring prieſtly orders. See the article ORDER.

CHIRURGERY, or SURGERY, is that part of medicine which is employed in manual operations.

The word is formed from the Greek, χειρ, the hand, and εργον, work.

Chirurgery is undoubtedly very ancient, but its inventor is very uncertain. Some attribute it to Apis, king of Egypt, though, perhaps, on no good foundation. But, be that as it will, it is certain that during the firſt ages it was nearly the ſole medicine, and conſequently it preceded phyſic in point of time. In the days of Hippocrates, ſurgery was ſo connected with medicine, that the former was ſcarce diſtinguiſhed from the latter by any peculiar and diſcriminating name: and that Hippocrates himſelf aſſiſted the ſick by manual operation, is a fact which cannot be called in queſtion. During theſe laſt forty years, ſurgery has been cultivated with very great ſucceſs. M. le Dran has furniſhed us with inſtructions which will inform the moſt ſkilful proficients. M. de la Faye, the ingenious commentator on Dionis, has likewiſe given us, in his notes, not only what his own experience and reflections have ſuggeſted, but alſo, as he ſays, the opinions and obſervations of the greateſt ſurgeons at Paris; and indeed the frequent mention he makes of Meſſ. Morand, Petit, de la Peyronie, and others, are ſufficient proofs that his comments are an exact repreſentation of the preſent ſtate of ſurgery in France. M. Garengeot's treatiſe on the operations of ſurgery lies under the diſadvantage of having been publiſhed ſome years ſince, and before many of thoſe improvements were made, which are now univerſally known: it, however, contains ſeveral caſes and remarks well worth the attention of a ſtudious reader. Heiſter's ſurgery is in every perſon's hands; and the character of Heiſter is ſo well eſtabliſhed, that any account of that work is needleſs. Nor need we mention the treatiſe of ſurgery, and critical enquiry, of the ingenious Mr. Sharp, ſince the name of the author is abundantly ſufficient.—If the reader deſires a more particular account of chirurgical authors, we refer him to Heiſter's Surgery, where he will find a very large catalogue of them.

CHISLEY-LAND, in agriculture, a ſoil of a middle nature, between ſandy and clayey land, with a large admixture of pebbles.

CHISSEL, an inſtrument much uſed in carpentry, maſonry, joinery, ſculpture, &c. and diſtinguiſhed according to the breadth of the blade into half-inch chiſſels, quarter-inch chiſſels, &c. They have alſo different names according to the different uſes to which they are applied; as, 1. The former, uſed by carpenters, &c. juſt after the work is ſcribed: it is ſtruck with a mallet. 2. The paring-chiſſel, which is uſed in paring off the irregularities made by the former: this is preſſed by the workman's ſhoulder. 3. The ſkew-former cleanſes acute angles with the point of its narrow edge. 4. The mortice-chiſſel, uſed in cutting deep ſquare holes in wood, for mortices: it is narrow, but thick and ſtrong, to endure hard blows. 5. Socket-chiſſels, having their ſhank made with a hollow ſocket at top, to receive a ſtrong wooden ſprig fitted into it with a ſhoulder. 6. Ripping chiſſel, having a blunt edge, with no baſil, uſed in tearing two pieces of wood aſunder. And 7. The gouge. See the article GOUGE.

CHITTING, among gardeners, is ſaid of a ſeed when it firſt puts forth its ſlender roots.

CHITUA, in the materia medica, a kind of lignum aloes, of a reddiſh colour. See the article LIGNUM-ALOES.

CHIVALRY, in law, is a tenure of ſervice, whereby the tenant is bound to perform ſome noble or military office to his lord; and is either regal, when held only of the king; or common, ſuch as may be held of a common perſon as well as the king: the former is properly called ſerjeantry, and the latter eſcuage. See the articles SERJEANTRY and ESCUAGE.

A ſtatute of Charles II. aboliſhes all tenures by chivalry, in capite, &c. and ordains that all tenures ſhall be conſtrued to be free and common ſoccage.

CHIVES, among gardeners, denote the ſame with the antheræ or apices of botaniſts. See the article ANTHERA.

Some alſo call the whole ſtamina of plants chives. See the article STAMINA.

CHIVES is alſo the Engliſh name of a very ſmall ſpecies of onion. See ONION.

CHLORITES, in natural hiſtory, a kind of green jaſper, but almoſt as pellucid as the coarſer emeralds. See JASPER.

CHLOROSIS, in medicine, a diſeaſe commonly called the green ſickneſs, incident to girls, maids, widows, and even wives whoſe huſbands are deficient.

Various are the ſymptoms of this diſorder, as a feveriſh habit of body, vomiting, difficulty of breathing, and longing for unnatural foods.

As to the cure, Aſtruc recommends borax, mineral waters, electuaries made of preparations of ſteel, the martial flowers, &c. aſafœtida, aloes and myrrh, emollient baths, frequent evacuations, and exerciſe; but above all, matrimony.

CHOCOLATE, in commerce, a kind of paſte, or cake, prepared of certain drugs, the baſis of which is the cacao-nut.

The Indians, in their firſt making of chocolate, uſed to roaſt the cacao in earthen pots, and having afterwards cleared it of the huſks, and bruiſed it between two ſtones, they made it into cakes with their hands. The Spaniards improved this method: when the cacao is properly roaſted, and well cleanſed, they pound it in an iron mortar, to reduce it into a coarſe maſs, which they afterwards grind, or levigate, on a ſtone, under which a charcoal fire is kept, till it be of the utmoſt fineneſs: when the paſte is ſufficiently ground, it is put quite hot into tin moulds, in which it congeals in a very little time.

The form of theſe moulds is arbitrary; the parallelogramic ones, holding about a quarter of a pound, are the moſt proper, becauſe the bigger the cakes are, the longer they will keep. Obſerve that theſe cakes are very liable to take any good or bad ſcent, and therefore they muſt be carefully wrapt up in paper, and kept in a dry place. Complaints are made, that the Spaniards mix with the cacao-nuts too great a quantity of cloves and cinnamon, beſides other drugs without number, as muſk, ambergriſe, &c. The grocers of Paris uſe few or none of theſe ingredients; they only chooſe the beſt nuts, which are called Caracca, from the place where they are produced, and with theſe they mix a very ſmall quantity of cinnamon, the freſheſt vanilla, and the fineſt ſugar, but very ſeldom any cloves. Among us in England, the chocolate is made of the ſimple cacao, excepting that ſometimes ſugar and ſometimes vanilla is added.

Explanation of plate XL. repreſenting the manner of making chocolate.

The upper compartment of the plate exhibits perſpective views of the different operations in making chocolate.

Fig. 1. is a workman roaſting the cacao nuts in an iron kettle or furnace.

Fig. 2. A perſon ſifting and freeing the roaſted kernels of the nuts from their huſks.

Fig. 3. A workman pounding the nuts in an iron mortar.

Fig. 4. A workman grinding or levigating the chocolate on a hard ſmooth ſtone, with an iron roller, over a chaffing-diſh of burning charcoal.

Lower compartment of the plate.

Fig. 1. The kettle or furnace for roaſting the cacao.

Fig. 2. A ſpatula for ſtirring the cacao in the furnace.

Fig. 3. The ſtone, with its frame and chaffing-diſh of coals, on which the chocolate is ground.

Fig. 4. The iron roller or muller.

Fig. 5, 6, 7. Moulds of different kinds.

CHOIR, that part of the church or cathedral where choiriſters ſing divine ſervice: it is ſeparated from the chancel, where the communion is celebrated; and alſo from the nave of the church, where the people are placed: the patron is ſaid to be obliged to repair the choir of the church. It was in the time of Conſtantine that the choir was ſeparated from the nave. In the twelfth century, they began to incloſe it with walls; but the ancient baluſtrades have been ſince reſtored, out of a view to the beauty of architecture.

Choir, in nunneries, is a large hall adjoining to the body of the church, ſeparated by a grate, where the nuns ſing the office.

CHOLAGOGUES, medicines which purge the bile. Of this kind are manna, caſſia, roſes, ſena, rhubarb, aloes, jalap, ſcammony, &c. There is ſome reaſon to think that antimonial medicines act more powerfully on the bile than any other remedies.

CHOLEDOCHUS, in anatomy, is a common epithet for the gall-bladder, the hepatic veſſels, and the common gall duct, which communicates with the duodenum.

CHOLER, or Bile. See Bile.

Cholera-Morbus, in medicine, the ſame with bilious fever. See Bilious.

CHOMELIA, in botany, a genus of plants, the flower of which conſiſts of one infundibuliform or funnel-faſhioned petal, the limb of which is divided into five oval and reflex ſegments: the fruit is a roundiſh bilocular berry, containing four ſeeds, gibboſe on one ſide, and angulated on the other.

CHOMER, Homer, or Omer, the ſame with corus. See the article Corus.

CHONDRILLA, in botany, a genus of plants, the compound flower of which is imbricated and uniform, the proper one monopetalous, ligulated, linear, truncated, and four or five times dentated; there is no pericarpium; the cup is of a cylindrical figure, containing ſolitary, ovated, compreſſed, ſcabrous ſeeds.

CHONDROGLOSSUM, in anatomy, the name of a pair of muſcles ariſing from the cartilaginous proceſs of the os hyoides, and meeting in the baſe of the tongue, where they are inſerted: this pair is not found in all ſubjects.

CHONDROPTERYGII, in ichthyology, one of the five orders or ſubdiviſions of fiſhes, the characters of which are theſe: the rays of the fins are cartilaginous, differing in little from the membrane that conſtitutes the fin; they have likewiſe cartilages inſtead of bones; and the mouth is for the moſt part ſituated in the lower part of the body.

CHOPIN, or Chopine, a liquid meaſure, uſed both in Scotland and France, and equal to half their pint. See the articles Pint and Measure.

CHORD, in geometry, is a right-line connecting the extremities of any arch of a circle.

Line of Chords is the chords of a circle projected on a right-line. See *Plane* Scale.

Chords, in muſic, are the ſtrings, or lines, by whoſe vibrations the ſenſation of ſound is excited, and by whoſe diviſions the ſeveral degrees of tune are determined.

They are called cords, or chords, from the Greek, χορδη, a name which the phyſicians give to the inteſtines; in regard the ſtrings of muſical inſtruments are ordinarily made of guts, though others are made of braſs or iron wire, as thoſe of ſpinnets, harpſichords, &c.

Chords of gold wire, in harpſichords, yield a ſound almoſt twice as ſtrong as thoſe of braſs: chords or ſtrings of ſteel yield a feebler ſound than thoſe of braſs, as being leſs heavy, and leſs ductile.

The tone of a ſound depends on the time or duration of the ſtroke made on the drum of the ear, by a wave or pulſe of air; for as that is longer or ſhorter, the tone will be more grave or acute: and ſince all pulſes move equally ſwift, the duration of a ſtroke will be proportional to the interval between two ſucceſſive pulſes; and conſequently a ſound is more or leſs grave or acute, in proportion to the length of that interval.

Hence it follows, that all the ſounds, from the loudeſt to the loweſt, which are excited by the vibrations of the ſame body, are of one tone. It likewiſe follows, that all thoſe bodies, whoſe parts perform their vibrations in the ſame or equal times, have the ſame tone: alſo thoſe bodies which vibrate ſloweſt have the graveſt and deepeſt tone, as thoſe which vibrate quickeſt have the ſharpeſt or ſhrilleſt tone.

The number of vibrations made by different chords in equal times, and upon which their tone depends, may be determined in the following manner: Where BAC (plate XXXVII. *fig.* 8.) repreſents the figure which a muſical chord aſſumes in its ſmall vibrations; then, as the tenſion of the chord is every where equal, let P repreſent this tenſion, or a weight equal to it, n a ſection of the chord perpendicular to its length; V the force by which the motion of any point at M towards AC is accelerated, while the chord returns to its natural ſtate in the circumference of a circle, whoſe diameter is 1. Biſect BC in S, and draw SA perpendicular to BC; from any point in SA, as G, draw QM parallel to BC, and MN parallel to SA; this done, we ſhall have $V = \frac{m^2 P}{n} \times \frac{\overline{SQ}^2}{4 SB^2}$. See the article Elastic *Curve.* If we now ſuppoſe N to repreſent the weight of the chord, L its length, g the force of gravity, D the length of a given pendulum, $SA = a$, SQ or $MN = y$; then, becauſe $N = ngL$, or $n = \frac{N}{Lg}$, and $L = 2 SB$, it follows that $V = \frac{m^2 gyP}{NL}$. Becauſe V is as y, the diſtance of M from AC, the vibrations of the chord are ſimilar to thoſe of a pendulum; and the time in which M deſcribes MN, is to the time in which the pendulum D performs half a vibration, as $\sqrt{\frac{y}{V}} : \sqrt{\frac{D}{g}}$, or as $\frac{\sqrt{LN}}{m\sqrt{P}}$ to $\sqrt{D}$; conſequently the number of vibrations made by the chord, while the pendulum vibrates once, is expreſſed by $m \times \sqrt{\frac{DP}{LN}}$, which ſerves for determining the number of vibrations made in a given time by any given chord that is extended by a given weight; or for comparing the number of vibrations made by different chords in equal times. Thus if the weight P be the ſame, the number of vibrations is as $\frac{1}{\sqrt{LN}}$; and when the chords are of the ſame kind (or N is as L) the vibrations are as $\frac{1}{L}$. If the chord be given, the number of vibrations is as $\sqrt{P}$. The ratio of m to 1, or of the circumference to the diameter, enters the expreſſion of the number of the vibrations of the chord; and there ſeems to be a difference in this reſpect betwixt the theorems by which the vibrations of a muſical chord, and thoſe which are produced in the air by organ-pipes, or other wind-inſtruments, are to be determined: in theſe, where the ſound is made by the vibration of a column of elaſtic air contained in the tube, the time of vibration or tone of the inſtrument will alſo vary with the length and diameter of the ſaid column of air, and force of the voice, which compreſſes it; as will be eaſy to obſerve from experiments.

If one body be made to ſound with another, their vibrations will coincide after a certain interval; and the ſhorter the interval of the coincidence, the more agreeable is the effect or conſonance to the ear; conſequently thoſe which are moſt frequent produce the moſt perfect conſonance or concord, as it is commonly called. When the times of vibration, therefore, are equal, the concord is moſt perfect, and more agreeable than any other; and this is called uniſon.

If the times of vibration are as 1 to 2, the coincidence will be at every ſecond vibration of the quickeſt; and ſo this is the next perfect concord, and is what we commonly call a diapaſon, or octave.

If the times of the vibration be as 2 to 3, the coincidence will be at every third vibration of the quickeſt, which therefore is in the next degree of perfection; and this is called a diapente, or fifth. If the times of vibration are as 3 to 4, the coincidence will be at every fourth of the leſſer; and this is called the diateſſaron, or fourth. But this and the next which follow in order, are not ſo agreeable and pleaſant to the judicious ear, and are therefore called imperfect concords.

Chord, *Corda*, in anatomy, a little nerve compoſed by a combination of ramuli of the fifth and ſeventh pairs, and extended in the manner of a chord, under the membrane of the drum of the ear. See the article Tympanum.

CHORDEE, in medicine and ſurgery, a ſymptom attending a gonorrhœa, conſiſting in a violent pain under the frenum, and along the duct of the urethra, during the erection of the penis, which is incurvated downwards. Theſe erections are frequent and involuntary.

The chordee being a ſqueezing of the corroded urethra between the cavernous bodies, and the erection being excited by the ſtimulating matter of a gonorrhœa, the cure is to be performed by preſerving the urethra from being corroded, or by ſuppreſſing the erection, by which means the preſſure of the urethra will be prevented. The firſt may be effected by mild diuretics, ſoftening emulſions, and cooling injections; but the laſt can only be performed by thoſe means that give the moſt ſudden check to the ſwelling of the penis, ſuch as immerſion in cold water.

It has been found by experience, that rubbing a mercurial ointment into the part affected, and along the duct of the urethra, has done conſiderable ſervice in this complaint.

CHOREA Sancti Viti, St. Vitus's Dance, in medicine. See the article Vitus's *Dance*.

CHOREPISCOPUS, or Country-Bishop, an aſſiſtant to a biſhop, firſt introduced into the church when the dioceſes became enlarged by the converſion of the pagans in the country and villages at a diſtance from the mother-church.

Chorepiscopus is alſo the name of a dignity in ſome cathedrals in Germany, ſignifying the ſame with chori-epiſcopus, or biſhop of the choir. The firſt chanter in the church of Cologne is called chori-epiſcopus.

CHOREUS, in ancient poetry, the ſame with trochæus or trochee. See the article Trochee.

CHORIAMBUS, in ancient poetry, a foot conſiſting of four ſyllables, whereof the firſt and laſt are long, and the two middle ones are ſhort; or, which is the ſame thing, it is made up of a trochæus and iambus: ſuch is the word nōbĭlĭtās.

CHORION, in anatomy, the exterior membrane which inveſts the fœtus in the uterus: it is thick, ſpongy, villoſe, and furniſhed with a vaſt apparatus of blood-veſſels. It is contiguous to the uterus, and is ſeparable into two membranes or parts.

CHOROBATA, or Chorobates, a kind of water-level among the ancients, of the figure of the letter T, according to Vitruvius's deſcription.

CHOROGRAPHY, the art of making a map of ſome country or province.

Chorography differs from geography, as the deſcription of a particular country does from that of the whole earth; and from topography, as the deſcription of a country differs from that of a town or diſtrict. See the articles Geography and Topography.

CHOROIDES, in anatomy, an epithet of ſeveral membranes, which on account of the multitude of their blood-veſſels reſemble the chorion. See Chorion.

Choroides denotes the coat of the eye placed immediately under the ſclerotica, the inferior lamella of which is called tunica Ruyſchiana; it is very full of veſſels, and coloured black.

Mr. Le Cat, in his deſcription of the parts of the eye, maintains Mariot's opinion of the choroid coat, and not the retina, being the immediate organ of viſion. The retina, according to him, is to the choroid, what the epidermis is to the ſkin.

Choroides is uſed for a portion of the pia mater. See the article *Pia* Mater.

Plexus Choroides is a convolution of the membranes of the brain, conſiſting of an aſſemblage of veins and arteries.

CHORO-FAVORITO, in the Italian muſic, a chorus in which are employed the beſt voices and inſtruments to ſing the recitatives, play the ritornellos, &c. It is otherwiſe called the little chorus, or choro recitante.

CHORUS, in dramatic poetry, one or more perſons preſent on the ſtage during the repreſentation, and ſuppoſed to be by-ſtanders, without any ſhare in the action.

Tragedy in its origin was no more than a ſingle chorus, who trod the ſtage alone, and without any actors, ſinging dithyrambics or hymns in honour of Bacchus. Theſpis, to relieve the chorus, added an actor, who rehearſed the adventures of ſome of their heroes; and Æſchylus, finding a ſingle perſon too dry an entertainment, added a ſecond, at the ſame time reducing the ſinging of the chorus, to make more room for the recitation. But when once tragedy began to be formed, the recitative, which at firſt was intended only as an acceſſory part to give the chorus a breathing-time, became a principal part of the tragedy. At length, however, the chorus became inſerted and incorporated into the action: ſometimes it was to ſpeak, and then their chief, whom they called coryphæus, ſpoke in behalf of the reſt: the ſinging was performed by the whole company; ſo that when the coryphæus ſtruck into a ſong, the chorus immediately joined him.

The chorus ſometimes alſo joined the actors in the courſe of the repreſentation, with their plaints and lamentations, on account of any unhappy accidents that befel them: but the proper function, and that for which it ſeemed chiefly retained, was to ſhew the intervals of the acts: while the actors were behind the ſcenes, the chorus engaged the ſpectators; their ſongs uſually turned on what was exhibited, and were not to contain any thing but what was ſuited to the ſubject, and had a natural connection with it; ſo that the chorus concurred with the actors for advancing the action. In the modern tragedies the chorus is laid aſide, and the fiddles ſupply its place. Mr. Dacier looks on this retrenchment as of ill conſequence, and thinks it robs tragedy of a great part of its luſtre; he therefore judges it neceſſary to re-eſtabliſh it, not only on account of the regularity of the piece, but alſo to correct, by prudent and virtuous reflections, any extravagancies that might fall from the mouths of the actors, when under any violent paſſion.

Mr. Dacier obſerved alſo, that there was a chorus, or grex, in the ancient comedy; but this is ſuppreſſed in the new comedy, becauſe it was uſed to reprove vices by attacking particular perſons; as the chorus of the tragedy was laid aſide to give the greater probability to thoſe kind of intrigues which require verſes

Chorus, in muſic, is when, at certain periods of a ſong, the whole company are to join the ſingers in repeating certain couplets or veſſels.

The word chorus is often placed in Italian muſic, inſtead of *tutti*, or *da capella*, which mean the grand chorus. When after chorus we meet with 1°, or *primo*, we muſt underſtand that it is to be played in the firſt chorus; if 2°, II°, or *ſecondo*, in the ſecond; and, conſequently, that the compoſition is for eight voices or different parts.

CHOSE, in the common law, is uſed with various epithets: as,

Chose *in Action* is an incorporeal thing, and only a right, as an annuity, bond, covenant, &c. and generally all cauſes of ſuit, for any duty or wrong, are accounted choſes in action.

Choſes in action may be alſo called choſes in ſuſpence, as having no real exiſtence, and not being properly in our poſſeſſion.

Chose Local is any thing that is annexed to a place, ſuch as a mill, &c.

Chose Transitory, ſomething moveable, and which may be taken away, or carried from place to place.

CHOUAN, in commerce, the Levant name for the ſeed of a ſpecies of ſantolina, known among us by that of carmine-ſeed, from its being often uſed in the preparation of that drug.

CHOUGH, or Cornish Chough, in ornithology, a ſpecies of corvus, otherwiſe called coracias. See the articles Corvus and Coracias.

CHRISM, χρισμα, oil conſecrated by the biſhop, and uſed in the Romiſh and Greek churches in the adminiſtration of baptiſm, confirmation, ordination, and extreme unction.

Chrism-Pence, a tribute anciently paid to the biſhop by the pariſh clergy for their chriſm, conſecrated at Eaſter for the enſuing year: this was afterwards condemned as ſimonaical.

CHRIST, Χριϛὸς, an appellation uſually given to our Saviour, anſwering exactly to the Hebrew Meſſiah, and ſignifying one that is anointed. See Messiah.

Order of Christ, a military order, founded by Dionyſius I. king of Portugal, to animate his nobles againſt the Moors.

The arms of this order are gules, a patriarchal croſs, charged with another croſs argent: they had their reſidence at firſt at Caſtromarin, afterward they removed to the city of Thomar, as being nearer to the Moors of Andaluſia and Eſtremadura.

Christ is alſo the name of a military order in Livonia, inſtituted in 1205, by Albert biſhop of Riga. The end of this inſtitution was to defend the new Chriſtians, who were converted every day in Livonia, but were perſecuted by the heathens. They wore on their cloaks a ſword with a croſs over it, whence they were alſo denominated Brothers of the Sword.

Christ-Thorn, in botany, a name given to the paliurus, a ſpecies of rhamnus. See the article Rhamnus.

CHRISTENING, denotes the ſame with baptiſm. See the article Baptism.

CHRISTIAN, in a general ſenſe, ſomething belonging to Chriſt.

Christian Religion, that inſtituted by Jeſus Chriſt.

If we examine the nature and tendency of the religion itſelf which was taught by Chriſt, and by the apoſtles in his name, we ſhall find it to be worthy of God. It retaineth all the excellencies of the Old Teſtament revelation; for our Saviour came not to deſtroy the law and the prophets, but to fulfil them, and carry the ſcheme of religion there laid down to a ſtill higher degree of excellency. The idea given us of God, of his incomparable perfections, and of his governing providence, as extending to all his creatures, particularly towards mankind, is the nobleſt that can be conceived, and the moſt proper to produce worthy affections and diſpoſitions towards him. Great care is eſpecially taken to inſtruct us to form juſt notions of God's illuſtrious moral excellencies, of his wiſdom, his faithfulneſs and truth, his impartial juſtice, and righteouſneſs, and ſpotleſs purity; but, above all, of his goodneſs and love to mankind, of which the goſpel contains and exhibits the moſt glorious and attractive diſcoveries and diſplays that were ever made to the world. The exceeding riches of the divine grace and mercy are repreſented in the moſt engaging manner. Pardon and ſalvation are freely offered upon the moſt gracious terms; the very chief of ſinners are invited, and the ſtrongeſt poſſible aſſurances given of God's readineſs to receive them upon their ſincere repentance and reformation; and at the ſame time, to prevent an abuſe of this, the moſt ſtriking repreſentations are made of God's juſt wrath and diſpleaſure, againſt thoſe that obſtinately go on in preſumptuous ſin and diſobedience. It is eſpecially the glory of the goſpel, that the great realities of an unſeen eternal world are there ſet in the moſt clear and open light; there are clearer diſcoveries made, and far ſtronger aſſurances given, of that future life and immortality, than were ever given to mankind before.

As to the precepts of Chriſtianity, they are unqueſtionably holy and excellent. The pureſt morality is taught in all its juſt and noble extent, as taking in the whole of our duty towards God, our neighbours, and ourſelves.

As to piety towards God, the idea there given of it is venerable, amiable, and engaging; we are required to fear God, but it is not with a ſervile horror, ſuch as ſuperſtition inſpires, but with a filial reverence. We are directed and encouraged to addreſs ourſelves to him as our heavenly Father through Jeſus Chriſt the ſon of his love, and in his name to offer up our prayers and praiſes, our confeſſions and thankſgivings, with the profoundeſt humility becoming creatures deeply ſenſible of their own unworthineſs, and yet with an ingenuous affiance, hope, and joy. We are to yield the moſt unreſerved ſubmiſſion to God as our ſovereign Lord, our moſt wiſe and gracious governor, and moſt righteous benefactor; to reſign ourſelves to his diſpoſal, and acquieſce in his providential diſpenſations, as being perſuaded that he ordereth all things really for the beſt; to walk continually as in his ſight, and with regard to his approbation, ſetting him before us as our great all-ſeeing witneſs and judge, our chiefeſt good and higheſt end. Above all, we are required to love the Lord our God with all our heart, and mind, and ſtrength, and to ſhew that we love him by keeping his commandments, by aſpiring after a conformity to him in his imitable perfections, and by endeavouring, as far as we are able, to glorify him in the world. As to the external worſhip of God, according to the idea given of it in the New Teſtament, it is pure and ſpiritual, and hath a noble ſimplicity in it. The numerous rites of the Moſaical diſpenſation, which, though wiſely ſuited to that time and ſtate, were marks of the imperfection of that œconomy, are now aboliſhed. The ordinances of Chriſtianity, as preſcribed in the goſpel, are few in number, eaſy of obſervation, and noble in their uſe and ſignificancy.

Not only doth Chriſtianity give the moſt excellent directions as to the duty we more immediately owe to God, but a mighty ſtreſs is there laid upon all ſocial duties and ſocial virtues, which it hath a manifeſt tendency to promote and improve. The conſtant exerciſe of juſtice, and righteouſneſs, and fidelity, is moſt expreſsly enjoined: the rendering to all their dues, and a diligent diſcharge of the duties of our ſeveral ſtations and relations, is bound upon us, not merely by civil conſiderations, but as a neceſſary part of religion. But what ought eſpecially to recommend Chriſtianity is, that a true and extenſive benevolence is there carried to the nobleſt height; it ſtrengthens the natural ties of humanity, and adds other ſacred and moſt engaging ties to bind us ſtill more ſtrongly to one another. We are taught to love our neighbours as ourſelves, to rejoice in their happineſs, and endeavour to promote it; to do good to all as far as we have opportunity; yea, even to extend our benevolence to our enemies themſelves, and to thoſe that have injured us; and to be ready to render good for evil, and overcome evil with good. It tends to diſcountenance and ſuppreſs that malice and envy, hatred and revenge, thoſe boiſterous angry paſſions, and malevolent affections and diſpoſitions, which have done ſo much miſchief in the world.

As to the exerciſe of ſelf-government, Chriſtianity is manifeſtly deſigned to improve and perfect human nature. It teaches us not only to regulate the outward actions, but the inward affections and diſpoſitions of the ſoul; to labour after real purity of heart, ſimplicity and godly ſincerity, as that without which no outward appearances can be pleaſing in the ſight of God. It ſtrikes at the root of all our diſorders and corruptions, by obliging us to correct and regulate that inordinate ſelf-love, which cauſes us to center all our views in ourſelves, in our own pleaſure, or glory, or intereſt, and by inſtructing us to mortify and ſubdue our ſenſual appetites and inclinations. It is deſigned to aſſert the dominion of the rational and moral powers over the inferior part of our nature, of the ſpirit over the fleſh, which alone can lay a juſt foundation for that moral liberty, and that tranquility of mind, which it is the deſign of all true philoſophy to procure and eſtabliſh. And whereas a too great love of the world, and its enjoyments, its riches, honours, or pleaſures, is the ſource of numberleſs diſorders in human life, and turns us aſtray in our whole courſe, it teacheth us to rectify our falſe opinions of theſe things, and not to ſeek happineſs in them, but to ſet our affections principally on things of a far higher and nobler nature, things celeſtial and eternal. And with regard to the evils of this preſent life and world, it tendeth to inſpire us with the nobleſt fortitude, and to render us ſuperior to thoſe evils, as being perſuaded that God will cauſe them to work together for our good, and will over-rule them to our greater happineſs. It provideth the beſt remedy, both againſt our cares and fears, eſpecially againſt the fear of death itſelf.

CHRISTIANS, thoſe who profeſs to believe and practiſe the Chriſtian religion, and are baptized in the name of Jeſus Chriſt.

Christians *of St. John*, a ſect of Chriſtians very numerous in Balſara, and the neighbouring towns: they formerly inhabited along the river Jordan, where St. John baptized, and it was from thence they had their name. They hold an anniverſary feaſt of five days, during which they all go to the biſhop, who baptizes them with the baptiſm of St. John. Their baptiſm is alſo performed on rivers, and that only on Sundays; they have no notion of the third perſon in the Trinity, nor have they any canonical book, but abundance full of charms, &c. Their biſhoprics deſcend by inheritance, as our eſtates do, though they have the ceremony of an election.

Christians *of St. Thomas*, a ſort of Chriſtians in a peninſula of India, on this ſide of the gulf: they inhabit chiefly at Cranganor, and the neighbouring country: theſe admit of no images, and receive only the croſs, to which they pay a great veneration. They affirm that the ſouls of the ſaints do not ſee God till after the day of judgment: they acknowledge but three ſacraments, viz. baptiſm, orders, and the euchariſt: they make no uſe of holy oils in the adminiſtration of baptiſm, but after the ceremony anoint the infant with an unction compoſed of oil and walnuts, without any benediction. In the euchariſt, they conſecrate with little cakes made of oil and ſalt; and inſtead of wine, make uſe of water in which raiſins have been infuſed.

CHRISTMAS, a feſtival of the Chriſtian church, obſerved on the 25th of December, in memory of the nativity of Jeſus Chriſt.

Whether this feſtival was always obſerved on the 25th of December, is a matter of doubt. Dr. Cave is of opinion that it was firſt kept by the Eaſtern church in January, and confounded with the Epiphany, till, receiving better information from the Weſtern churches, they changed it to that day. St. Chryſoſtom affirms, that it was not above ten years ſince Chriſtmas began to be celebrated in the church of Antioch upon that day: Clemens Alexandrinus reckons, from the birth of Chriſt to the death of Commodus, exactly one hundred and ninety-four years, one month, and thirteen days; which time, being taken according to the Egyptian account, and reduced to the Julian or Gregorian ſtile, makes the birth of Chriſt fall on the 25th or 26th of December; yet, notwithſtanding this, the ſame father tells us, that there were ſome who more curiouſly ſearching after the year and day of Chriſt's nativity, affixed the latter to the 25th of the month *Pachon*. Now in that year in which Chriſt was born, the month *Pachon* commenced the 20th of April; ſo that according to this computation, Chriſt was born on the 16th of May. Hence we may ſee how little certainty there is in this matter, ſince ſo ſoon after the event, the learned were divided in opinion concerning it. As to the antiquity of this feſtival, the firſt footſteps we find of it were in the ſecond century, about the time of the emperor Commodus.

Christmas-Rose, in botany, a name ſometimes given to a ſpecies of black hellebore. See the article Hellebore.

CHRISTOLYTE, in church-hiſtory, a ſect of Chriſtian heretics, who maintained that Chriſt deſcended into hell, body and ſoul, and that he left both there, aſcending into heaven with his divinity alone.

CHRISTOMACHI, an appellation given to all heretics, who deny Chriſt's divinity, or maintain heterodox opinions concerning his incarnation.

CHRISTOPHORIANA, chriſtopher-herb, in botany, a genus of plants, called by Linnæus actæa; the flower of which is roſaceous, conſiſting of four petals: the fruit is a roundiſh, oval, unilocular berry, containing a number of ſemi-circular ſeeds, diſpoſed in a double row, with their ſtraight ſides towards each other.

CHROASTACES, in natural hiſtory, a genus of pellucid gems, comprehending all thoſe of variable colours, as viewed in different lights; of which kind are the opal and the aſteria, or oculus cati. See the articles Opal and Asteria.

CHROMA, in muſic, a note or character of time, uſually termed a quaver. See the articles Character and Quaver.

Chroma is alſo a graceful way of ſinging, or playing with quavers and trilloes.

CHROMATIC, in the ancient muſic, the ſecond of the three kinds into which the conſonant intervals were ſubdivided into their concinnous parts. The other two kinds are enharmonic and diatonic. See the articles Enharmonic, &c.

The chromatic abounds in ſemitones: it had its name by reaſon the Greeks marked it with the character of colour, which they call χρωμα; or, as P Parran ſays, becauſe it is the medium between the other two; as colour is between black and white; or becauſe the chromatic kind varies, and embelliſhes the diatonic by its ſemitones, which have the ſame effects in muſic, as the variety of colours have in painting.

Chromatic, in painting, a term uſed to ſignify the colouring, which makes the third part in the art of painting.

CHRONIC, or **Chronical**, among phyſicians, an appellation given to diſeaſes that continue a long time, in contradiſtinction to thoſe that ſoon terminate, and are called acute.

If health conſiſts in a free and uninterrupted circulation of the vital juices through the veſſels, and a diſeaſe in an interruption of this circulation, we may conceive that an acute diſtemper ariſes when many and extenſive obſtructions occupy a great number of the veſſels all of a ſudden; for then the uſual quantity of blood is impelled through a ſmaller ſpace, and returns ſooner to the heart: in conſequence of this, the contractions of the heart are more frequent, the velocity of the circulating juices is greater, the reciprocal action between the ſolids and fluids is increaſed, and of courſe the heat of the body.

But when obſtructions are formed by degrees, and by little at a time, however extenſive they may become ultimately, no ſuch ſudden alteration is induced; but the vital powers, perhaps, by diſcharging out of the body a portion of the ſuperfluous juices, find a way of preſerving the equilibrium betwixt the ſolids and fluids, and of adapting the circulating fluids to the capacity of the pervious veſſels, without raiſing a degree of fever ſufficient to impart the name of acute to the diſorder. Chronical diſeaſes then may be ſaid to be produced in the body by ſome peccancy in the juices, either contracted inſenſibly and by degrees, or elſe left by ſome acute diſtemper ill cured.

CHRONICLE, χρονικον, in matters of literature, a ſpecies or kind of hiſtory, diſpoſed according to the order of time, and agreeing in moſt reſpects with annals. See the article Annals.

The word chronicle is now become obſolete, being ſeldom uſed except in ſpeaking of the old Engliſh hiſtories, as Stow's Chronicle, Holinſhead's Chronicle, &c.

Books of **Chronicles**, in the canon of Scripture, two ſacred books, called by the Greeks, *paralipomena*, παραλειπομενα; that is, remains, additions, or ſupplements, as containing many circumſtances omitted in the other hiſtorical books.

In effect, the paralipomena, or chronicles, are an abridgement of ſacred hiſtory to the return of the Jews from the Babyloniſh captivity. The firſt book traces the genealogies of the Iſraelites from Adam, deſcribes the death of king Saul, and gives a brief but accurate account of king David's reign. The ſecond as faithfully traces the progreſs of the kingdom of Judah, its various revolutions, its periods under king Zedekiah, and the reſtoration of the Jews by Cyrus.

CHRONOGRAM, χρονογραμμα, a ſpecies of falſe wit, conſiſting in this, that a certain date or epocha is expreſſed by numeral letters of one or more verſes: ſuch is that which makes the motto of a medal ſtruck by Guſtavus Adolphus, in 1632:

ChrIſtVs DVX, ergo trIVMphVs.

Such alſo are the two following verſes, made on the duke of Weymar, on taking Briſac, in 1638:

In VICto fortIs CeCIDIt BræIſæIs AChILLI,
IVngItVr & tanto DIgna pVeLLa VIro.

CHRONOLOGY, the art of computing time, in order to determine, with accuracy, the events mentioned in hiſtory.

The word is formed from the Greek, χρονος, time, and λογος, a diſcourſe.

Chronology has been juſtly called the ſoul of hiſtory; for without chronology hiſtory is lifeleſs, and no better than a dead body, without ſenſe or underſtanding: and unleſs the times of hiſtorical narrations are in ſome meaſure aſcertained, hiſtory will be very little preferable to romance. We ſay in ſome meaſure, becauſe it is ſome times impoſſible to fix the æras or epochas of tranſactions with certainty; and the farther we go back into antiquity, the greater will this uncertainty be.

It is therefore no wonder that men of learning have applied themſelves principally to the chronology of the earlieſt times. M. Fontenelle, in his Panegyric on M. Bianchini, compares the firſt times to a vaſt ruinated palace, the materials of which lie all together in confuſion, and a great part of them deſtroyed. The more theſe materials are deficient, ſo much the more room is there to form different plans, which have no correſpondence, out of thoſe which remain. Such is the ſtate of ancient hiſtory. Beſides, materials are not only wanting on account of the vaſt number of books which have been loſt, but thoſe which remain frequently contradict each other.

We muſt therefore either reconcile theſe, or reſolve to make a choice of what we think probable; which, however, muſt always be ſuſpected of being arbitrary. All the chronological enquiries, hitherto made, are more or leſs ſucceſsful combinations of theſe indigeſted materials; and who can be aſſured the number of combinations is exhauſted? Are not new ſyſtems of chronology publiſhed every day? Moreri, in his Dictionary, tells us, there are ſeventy different opinions concerning the chronology from the beginning of the world to our Saviour: we ſhall content ourſelves with mentioning the moſt celebrated authors. Julius Africanus, Dionyſius the younger, Euſebius, St. Cyril, Bede, Scaliger, Petavius, Uſher, Marſham, Voſſius, Pagi, Pezron, M. Deſvignoles, Mr. Freret, Jackſon, and Sir Iſaac Newton: illuſtrious names! How difficult is the ancient chronology, ſince, after the labours of ſo many eminent men, we ſeem rather to have ſeen, than cleared up, the obſcurity of it. It is a kind of immenſe perſpective, and out of ſight; the bottom being interſperſed with thick clouds, through the intervals of which ſome glimmerings of light appear.

If it only related to ſome particular events, we ſhould not be ſurprized at the diſagreement between theſe great men; but the points in queſtion are concerning the moſt remarkable events in hiſtory, both ſacred and profane; namely, the number of years ſince the creation; the diſtinction between the ſacred and civil years among the Jews; the ſojourning of the Iſraelites in Ægypt; the chronology of the judges and kings of Juda and Iſrael; the beginning of the years of the captivity, and of Daniel's ſeventy weeks; the hiſtory of Judith and Eſther; the birth, miſſion, and death of the Meſſiah, &c. the origin of the Chineſe empire; the dynaſties of Ægypt; the epocha of the reign of Seſoſtris; the beginning and end of the Aſſyrian empire; the chronology of the kings of Babylon and Media; of the ſucceſſors of Alexander, &c. not to mention the fabulous and heroic ages, wherein the difficulties are ſtill more numerous, as the Abbè Artigni has well obſerved, in his Memoir concerning Literature and Hiſtory. Whence the judicious author, laſt quoted, concludes it needleſs to ſet about reconciling the old ſyſtems, or deviſing new; it is ſufficient, ſays he, to pitch upon one, and ſtick to it; and this opinion ſeems to coincide with that of other learned men, whom we have conſulted on this occaſion. As, for example, take Uſher's ſyſtem, which is at preſent in great repute, or that of Petavius, in his Rationarium Temporum. In writing ancient hiſtory, we are to mention whoſe chronology we follow, for fear of leading our readers into an error; for, according to ſome authors, there are, from the beginning of the world to the Chriſtian æra, but 3740 years; according to others, 6934; which makes a difference of 3194 years.

It ſeems a matter of no great importance to mention, at large, the various ſentiments of chronologers, or enumerate the proofs they bring in ſupport of their different opinions; the reader will do well to apply to their different works. The following are the moſt famous opinions concerning the age of the world, from the creation to the birth of our Saviour.

According to the Vulgate,

	Years.
Uſher	4004
Scaliger	3950
Petavius	3984
Riccioli	4184

According to the Septuagint,

	Years.
Euſebius	5200
The Alphonſine Tables	6934
Riccioli	5634
Jackſon	5426

The birth of Chriſt is very much diſputed: authors vary, even in this point, ſeven or eight years. But, ſince that time, chronology begins to be much more certain, by the number of monuments we have left, and the differences we meet with in authors being much leſs conſiderable.

According to Sir Iſaac Newton, the world is not ſo old by five hundred years as other chronologers have made it: the proofs he produces are of two kinds.

The firſt turn on the valuation of generations. The Ægyptians reckoned three hundred and forty-one generations from Menes to Sethos, and accounted three generations one hundred years. The ancient Greeks reckoned forty years a generation: in which Sir Iſaac thinks them both miſtaken. It is true, three ordinary generations may be computed at about one hundred and twenty years, but generations are longer than reigns; becauſe it is evident, that men in general live longer than kings reign. According to Sir Iſaac, every reign, one with another, is about twenty years: this he proves from conſidering the reigns of the kings of England, from William the Conqueror to George the Firſt; from the reigns of the firſt twenty-four, the ſecond twenty-four, and fifteen following kings of France; and from the whole ſixty-three taken together. The ancients, therefore, erred in their calculation, by computing a generation at forty years.

The other kind of his arguments is yet more ſingular, and drawn from aſtronomy; which the reader will find in the Dictionary, under this article.

Upon the ſtrength of theſe two arguments, taken together, Sir Iſaac concludes, that the expedition of the Argonauts ought to be placed 909 years before Chriſt, and not 1400; which leſſens the age of the world almoſt 500 years.

M. Freret, by comparing and conſidering the hiſtory of known times, apprehends Sir Iſaac to lie under a miſtake, in computing every generation of kings at twenty years. He finds, on the contrary, by different calculations, that they ought to be reckoned at leaſt at thirty years, or, rather, between thirty and forty. He proves his aſſertion by the 24 generations from Hugh Capet to Lewis XV. which make 770 years, or 32 years to a generation. It is very ſingular, that the calculations of Sir Iſaac and M. Freret ſhould both be right, and yet the reſult be different. The difference ariſes from hence; Sir Iſaac counts by reigns; M. Freret by generations. As for example, from Hugh Capet to Lewis XV. there are only 24 generations, but 32 reigns; and by allowing about twenty years for every reign, and above thirty for every generation, it follows, that, if Sir Iſaac's calculation be too little, M. Freret's is too much. Reigns in general muſt not only be ſhorter than generations, but the generations of kings muſt be ſhorter than thoſe of private perſons, becauſe kings are married younger.

With regard to the aſtronomical proofs, M. Freret obſerves, that the poſition of the ſtars and points of the equinox is by no means exact, in the writings of the ancients; that authors of the ſame age differ very much on this head. It is very probable, according to this learned chronologiſt, that Meton, by placing the ſummer ſolſtice in the eighth degree of Cancer, rather conformed to the received opinion of his age, than the truth; it being the common cuſtom among us to place the vernal equinox in the firſt degree of Aries, though its ſituation has long been far from it. M. Freret corroborates this conjecture by many arguments, the principal of which are theſe: Achilles Tatius tells us, that ſeveral aſtronomers placed the ſummer ſolſtice in the firſt degree of Cancer, others the 8th, others the 15th; Euctemon made an obſervation of the ſolſtice with Meton, and Euctemon placed the autumnal equinox in the firſt degree of Libra; which is a proof, ſays M. Freret, that Meton, when he fixed the ſummer ſolſtice in the 8th degree of Cancer, ſubſcribed to the popular acceptation, not to truth. To follow the laws of the preceſſion of the equinoctial points, the equinox muſt have been in the 8th degree of Aries 964 years before the Chriſtian æra; and this is much about the time that the calendar followed by Meton muſt have been publiſhed. Hipparchus places the equinoctial points at fifteen degrees diſtance from that of Eudoxus; from whence there would follow the difference of an interval of 1080 years between Hipparchus and Eudoxus, which is by no means to be maintained. M. Freret to theſe proofs adds ſeveral others, but too long for us to inſert: and the reader would do well to read Sir Iſaac's ſhort anſwer to theſe remarks of M. Freret, publiſhed in 1726; in which are ſome articles that merit the greateſt attention.

Chronology is not confined to paſt times, and fixing ancient epocha's; it extends itſelf to other uſes, particularly in the church. By the help of this, we fix the moveable feaſts; and among others, that of Eaſter; and by the means of the epacts, periods, and cycles, &c. we form the calendar. So that there are properly two kinds of chronology; one purely hiſtorical, founded on facts tranſmitted to us by antiquity; the other mathematical and aſtronomical, which ſettles the different epocha's by calculations and obſervations, and ſerves to regulate the ſeaſons when the feaſts of the church ſhould be celebrated.

CHRONOMETER, in general, denotes any inſtrument, or machine, uſed in meaſuring time; ſuch are dials, clocks, watches, &c.

The term chronometer, however, is generally uſed in a more limited ſenſe, for a kind of clock ſo contrived as to meaſure a ſmall portion of time with great exactneſs, even to the ſixteenth part of a ſecond: of ſuch a one there is a deſcription in Deſaguliers's Experimental Philoſophy, invented by the late ingenious Mr. George Graham; which muſt be allowed to be of great uſe for meaſuring ſmall portions of time in aſtronomical obſervations, the time of the fall of bodies, the velocity of running waters, &c. But long ſpaces of time cannot be meaſured by it with ſufficient exactneſs, unleſs its pendulum be made to vibrate in a cycloid; becauſe, otherwiſe, it is liable to err conſiderably, as all clocks are which have ſhort pendulums that ſwing in large arches of a circle.

CHRYSALIS, in natural hiſtory, a ſtate of reſt and ſeeming inſenſibility which butterflies, moths, and ſeveral other kinds of inſects, muſt paſs through before they arrive at their winged or moſt perfect ſtate. See BUTTERFLY.

The firſt ſtate of theſe animals is in the caterpillar or reptile form: then they paſs into the chryſalis-ſtate, wherein they remain immoveably fixed to one ſpot, and ſurrounded with a caſe or covering, which is generally of a conical figure; and, laſtly, after ſpending the uſual time in this middle ſtate, they throw off the external caſe wherein they lay impriſoned, and appear in their moſt perfect and winged form of butterflies, or flies. See CATERPILLAR.

Through the whole courſe of this transformation, the animal remains the ſame, only ſurrounded with different coverings: in the caterpillar form, it is a kind of fœtus, or embryo, wrapped up in ſeveral coats, the limbs of which can only be diſcovered by the aſſiſtance of the microſcope: in the chryſalis or nymph-ſtate, it acquires a farther degree of maturity; and then the limbs, wings, &c. become perfectly diſtinct; and at length it diſengages itſelf, and becomes an inhabitant of the air, adorned with a peculiar kind of plumage: in this laſt ſtate the two ſexes copulate, and the female lays her eggs to be afterwards hatched into caterpillars, and to paſs through the like changes with the parent-inſect.

CHRYSANTHEMUM, in botany, a genus of plants, the compound flower of which is radiated, the proper hermaphrodite one of the funnel-form, and the female ligulated, oblong, and tridentated. There is no pericarpium: the immutated cup contains, in the hermaphrodite, ſolitary, oblong, naked ſeeds; in the female, ſeeds very like thoſe of the hermaphrodite.

CHRYSOBALANUS, in botany, a genus of plants, the flower of which conſiſts of five ovated, plain, patent petals; the fruit is an ovated large berry, with one cell, containing an ovated, brittle, wrinkled kernel, with five furrows.

CHRYSOBERYL, a kind of beryl with a tincture of yellow. See BERYL.

CHRYSOCOLLA, in natural hiſtory, a ſpecies of green ochres. See OCHRA.

CHRYSOCOLLA is alſo uſed for gum ammoniac. See AMMONIAC.

CHRYSOCOMA, or CHRYSOCOME, goldylocks, in botany, a genus of plants, the compound flower of which is tubulous, the proper one of a funnel-form, with a quinquifid limb. There is no pericarpium, but the cup ſcarcely immutated, contains ſolitary, ovato-oblong, compreſſed ſeeds, crowned with a hairy down.

CHRYSOGONUM, moth-mullein, in botany, a genus of plants, the univerſal flower of which is radiated; the proper hermaphrodite one of a funnel-form quinquidentated and erect; the female one plain, oblong, truncated, andtridentated. There is no pericarpium: the immutated cup contains ſolitary, obverſo-cordated, quadrangular ſeeds in the female; the hermaphrodites prove abortive.

CHRYSOLITE, in natural hiſtory, a gem which the ancients knew under the name of the topaz; and the true chryſolite of the ancients, which had its name from its fine gold-yellow colour, is now univerſally called topaz by modern jewellers. See the article TOPAZ.

The chryſolite of our times is found of various ſizes: the moſt common, however, when pureſt and moſt valuable, is about the ſize of a nutmeg. It is of various figures, but never columnar, or in the figure of cryſtal. Sometimes it is found in roundiſh, irregular, pebble-like maſſes; at other times flat and oblong, but always with a rude ſurface. Its colour is a pale dead green, with an admixture of yellow; but the moſt uſual tinge is the colour of an unripe olive, with ſomewhat of a braſſy yellow. It is very ſoft in compariſon of the other gems, and its fineſt pieces does not exceed chryſtal in hardneſs. It is found in New Spain, and in ſeveral parts of Sileſia and Bohemia. The American ones are greatly ſuperior to the European, but are uſually ſmall: the Bohemian are very large; and few of them are of a clear colour, or free from flaws.

CHRYSOLITE-PASTE, a kind of glaſs made in imitation of natural chryſolite, by mixing two ounces of prepared chryſtal with ten ounces of red-lead, adding twelve grains of crocus martis made with vinegar; and then baking the whole for twenty-four hours, or longer, in a well-luted crucible.

CHRYSOPHYLLUM, ſtar-apple, in botany, a genus of plants, the flower of which is monopetalous and campanulated, with the limb divided into ten ſegments, alternately roundiſh and patulous, and narrow and erect: the fruit is a ſubovated large berry, with one cell, containing three oſſeous ſeeds.

CHRYSOPRASUS, or Chryſopraſius, the tenth of the precious ſtones mentioned in the Revelations as forming the foundation of the heavenly Jeruſalem.

The chryſopraſius is a ſpecies of praſius, of a pale but pure green colour, with an admixture of yellow. See Praſius.

CHRYSOSPLENIUM, golden-ſaxifrage, in botany, a genus of plants, without any flower-petals, unleſs the cup, which is coloured, be reckoned ſuch: the fruit is an unilocular, two-horned capſule, containing a number of very minute ſeeds.

CHUB, or Chubb, in ichthyology, the Engliſh name of a ſpecies of cyprinus, with eleven rays in the pinna ani. See the article Cyprinus.

CHUPMESSAHITES, a ſect of Mahometans, who believe that Jeſus Chriſt was God, and the redeemer of the world; an opinion which they maintain with ſuch courage, as to chooſe to die rather than deny it.

This ſect is ſaid to be very numerous, though few dare make profeſſion of it openly. The word ſignifies as much as protectors of the Chriſtians.

CHURCH, has different ſignifications, according to the different ſubjects to which it is applied. 1. It is underſtood of the collective body of Chriſtians, or all thoſe over the face of the whole earth, who profeſs to believe in Chriſt, and acknowledge him to be the Saviour of mankind. This is what the ancient writers call the Catholic or univerſal church. Sometimes the word church is conſidered in a more extenſive ſenſe, and divided into ſeveral branches; as the church militant, is the aſſembly of the faithful on earth; the church triumphant, that of the faithful already in glory, to which the papiſts add the church patient, which, according to their doctrines, is that of the faithful in purgatory.

2. Church is applied to any particular congregation of Chriſtians, who at one time, and in one place, aſſociate together and concur in the participation of all the inſtitutions of Jeſus Chriſt, with their proper paſtors and miniſters. Thus we read of the church of Antioch, the church of Alexandria, the church of Theſſalonica, and the like.

3. Church denotes a particular ſect of Chriſtians diſtinguiſhed by particular doctrines and ceremonies. In this ſenſe we ſpeak of the Romiſh church, the Greek church, the reformed church, the church of England, &c.

4. The word church is uſed to ſignify the body of eccleſiaſtics, or the clergy, in contradiſtinction to the laity. See the article Clergy.

5. Church is uſed for the place where a particular congregation or ſociety of Chriſtians aſſemble for the celebration of divine ſervice. In this ſenſe, churches are variouſly denominated, according to the rank, degree, diſcipline, &c. as metropolitan church, patriarchal church, cathedral church, parochial church, collegiate church, &c. See Metropolis, Patriarch, &c.

Church-Wardens, formerly called church-reeves, are officers choſen yearly, in Eaſter-week, by the miniſter and pariſhioners of every pariſh, to look after the church, church-yard, church-revenues, &c. alſo to obſerve the behaviour of the pariſhioners, in relation to ſuch miſdemeanors as appertain to the cenſure or juriſdiction of the eccleſiaſtical court.

CHURCHING *of Women after Child-Birth*, an office in the Liturgy, containing a thankſgiving to be uſed by women after being delivered from the great pain and peril of child-birth.

This practice, like many other Chriſtian uſages, undoubtedly took its riſe from the Jewiſh rite of purification enjoined by the law of Moſes.

CHURLE, Ceorle, or Carl, in the time of the Saxons, ſignified a tenant at will, who held land of the thanes on condition of rent and ſervice. They were of two ſorts, one like our farmers that rented the out-land eſtates, the other which tilled and manured the demeſnes, and therefore called ploughmen.

CHYLE, in the animal œconomy, a milky fluid, ſecreted from the aliments by means of digeſtion.

The principles of the chyle ſeem to be ſulphureous, mucilaginous, ſaline, and aqueous. It is a kind of natural emulſion, both with regard to the colour, the ingredients, and the manner of preparation. There is this difference between the artificial and natural emulſion, that the latter is far more pure, and is prepared with much greater apparatus, not by the ſudden expreſſion of part of the liquid, but by a gentle and ſucceſſive percolation.

The chyle is made ſooner or later, according to the difference of the temperaments, ſtrength, aliments and cuſtoms: therefore how many hours chylification requires, cannot be certainly determined. When the chyle enters the villous oſcula of the lacteals, it is not a fluid extracted merely from the aliment and drink, but a mixture of ſeveral fluids; that is, the ſaliva and thinner mucus of the mouth, and the two fluids of the oeſophagus, one proceeding from the villous membrane of the tube itſelf, the other from its glands. To theſe may be added the glutinous fluid of the ſtomach, the pancreatic juice, the fluid of Peyer's glands, which are very numerous in the ſmall inteſtines Hence the reaſon appears, why men may live upon bread and water, why the oriental nations uſe rice in the room of all kinds of pulſe, and why acids, ſpirituous liquors, ſaline things, and many vegetable juices, herbs, roots, acrid and aromatic ſubſtances, are the leaſt fit to generate chyle.

Some of the ancients ſuppoſed the chyle was changed into blood in the liver; others of them in the heart: but the moderns, with more reaſon, take the change to be effected by the blood itſelf, in all the parts of the body.

CHYLIFICATION, the formation of the chyle, or the act whereby the food is changed into chyle. See the articles Food and Chyle.

Chylification commences by comminuting the aliment in the mouth, mixing it with ſaliva, and chewing it with the teeth; by theſe means the food is reduced into a kind of pulp, which, being received into the ſtomach, mixes with the juices thereof; and thus diluted, begins to ferment or putrify; and aſſuming a very different form from what it had before, grows either acid or rancid. Here it meets with a juice ſeparated from the blood by the glands of that part, whoſe excretory ducts open into the cavity of the ſtomach; by the commixture of theſe liquors, whether of ſaliva or the juice of the ſtomach, a proper menſtruum is compoſed, by which the parts of the aliment are ſtill more and more divided by its inſinuating into their pores, and acquire ſtill a greater likeneſs to the animal fluids, and from what is called chyme. The ſtomach, by means of its muſcular fibres, contracting itſelf, does gradually diſcharge its contents by the pylorus into the duodenum; in which gut, after a ſmall ſemicircular deſcent, it meets with the pancreatic juice and bile; both which joining with it, renders ſome part of the aliment more fluid, by ſtill diſuniting the groſſer parts from the more pure, and here the chylification is made perfect.

The bile, which abounds with lixivial ſalts, and apt to entangle with the groſſer parts of the concocted aliment, ſtimulates the guts, and cleanſes their cavities of the mucous matter ſeparated from the blood by the glands of the guts, and lodged in their cavities; which not only moiſtens the inſide of the guts, but defends the mouth of the lacteal veſſels from being injured by alien bodies, which often paſs that way.

The contents of the inteſtines move ſtill on, by means of the periſtaltic motion of the guts; whilſt thoſe thinner parts, fitted to the pores of the lacteal veſſels, are abſorbed by them: the thicker move ſtill more ſlowly on, and by the many ſtops they continually meet with by the connivent valves, all the chyle or thin parts are at length entirely abſorbed; the remains being merely excrementitious, are only fit to be protruded by ſtool.

In the paſſage through the ſmall inteſtines, the finer part of the maſs, which we call chyle, as has been already obſerved, enters the orifices of the lacteal veſſels of the firſt kind, wherewith the whole meſentery is intermixed, which either alone, or together with the meſeraic veins, diſcharge themſelves into the glands, at the baſis of the meſentery.

Then the chyle is taken up by the lacteals of the ſecond kind, and is conveyed into glands between the two tendons of the diaphragm, called Pecquet's Reſervatory; whence it is carried to the heart by the thoracic duct and the ſubclavian vein: and here it firſt mixes with the blood, and in time becomes aſſimilated thereto.

CHYMISTRY, or Chemistry. See the article Chemistry.

CICATRICULA, among natural hiſtorians, denotes a ſmall whitiſh ſpeck in the yolk of an egg, ſuppoſed to be the firſt rudiments of the future chick.

CICATRIX, in ſurgery, a little ſeam or elevation of callous fleſh riſing on the ſkin, and remaining there after the healing of a wound or ulcer. It is commonly called a ſcar.

In young infants theſe ſcars diminiſh much, and ſometimes vaniſh quite when they come to age, as may be ſeen in the pits of the ſmall-pox; and in growing, they are ſometimes obſerved to change their ſituation.

A ſurgeon in curing a wound, ought to be very induſtrious to procure an even cicatrix; for which purpoſe it will be proper to dry by degrees, and to harden the ſurface of the new fleſh, by the application of dry lint covered with a light bandage: but when this is not ſufficient, it may be proper to uſe ſome of the drying eſſences or native balſams, or drying powders; ſuch as tutty, lapis calaminaris, maſtich, or colophonium. Rectified ſpirits of wine, which is of an aſtringent drying virtue, is frequently uſed for this purpoſe with great advantage. See the article Wound.

CICATRIZANTS, in pharmacy, medicines which aſſiſt nature to form a cicatrix. Such are Armenian bole, powder of tutty, deſiccativum rubrum, &c.

Cicatrizants are otherwiſe called eſcharotics, epulotics, incarnatives, agglutinants, &c.

CICELY, the Engliſh name of a genus of plants, called by botanical writers myrrhis. See the article Myrrhis.

CICER, the chick-pea, in botany, a genus of plants, the flower of which is papilionaceous: the fruit is a turgid pod, of a rhomboid ſhape, containing two roundiſh ſeeds.

The ſeeds of this plant are accounted in ſome meaſure abſterſive, and for that reaſon are met with in diuretic compoſitions in the officinal medicines: but they are very ſeldom found in other preſcriptions. Chick-peaſe was the proviſion of the ancient Hebrews, when they took the field. They parched them, and ſo eat them; and at this day, in Egypt, it is uſual for thoſe who undertake a long journey, to lay in a good ſtock of chick-peaſe, parched in a frying-pan.

CICHORIUM, ſuccory, in botany, a genus of plants, the compound flower of which is plain and uniform: the proper one, monopetalous, ligulated, truncated, and deeply quinquidentated: there is no pericarpium, but the cylindrical cup, connivent at the top, contains ſolitary compreſſed ſeeds with acute angles.

This plant is regarded in all the ſhop compoſitions, where it is concerned, as an hepatic. We ſeldom meet with it in extemporaneous preſcriptions, unleſs in a few medicated ales.

CICINDELA, in zoology, the ſame with the pyrolampis, or glow-worm, a genus of inſects, the antennæ of which are ſetaceous, and ſlender as a thread: the jaws are prominent and dentated; and the thorax is of a roundiſh but ſomewhat angulated figure.

Of this genus authors enumerate the following ſpecies. 1. The field or green glow-worm, with ten white ſpots on the exterior wings. 2. The black glow-worm, with ſix white ſpots on the exterior wings, common in woody places. 3. The braſſy glow-worm, with broad excavated ſpots on the wings, common about the banks of rivers. 4. The black glow-worm, with a reddiſh thorax; and ſeveral other ſpecies diſtinguiſhed by the like peculiarities.

CICUTA, hemlock, in botany, a tall umbelliferous plant, with large leaves, of a blackiſh green colour on the upper ſide, and a whitiſh green underneath, divided into a number of ſmall oblong, ſomewhat oval, ſegments, which ſtand in pairs on middle ribs: theſe ſegments are again deeply cut, but not quite divided, on both ſides; and many of theſe ultimate ſections have one or two ſlighter indentations. The ſtalk is round, ſmooth, hollow, irregularly variegated with ſpots and ſtreaks of a red or blackiſh purple colour. The flowers are white; the ſeeds greeniſh, flat on one ſide, very convex and marked with five furrows on the other. The root is oblong, about the ſize of a middling parſnip, yellowiſh without, white and fungous within. The plant is biennial; common about the ſides of fields, under hedges, and in moiſt ſhady grounds; and flowers in June and July.

The leaves of hemlock have a rank ſmell, of that kind which is called narcotic and viroſe: the organs of taſte they affect but little. On expreſſion, they give out their ſmell to the juice; which, on being directly inſpiſſated with a gentle heat, to the conſiſtence of an extract, retains great part of the ſcent, and diſcovers an unpleaſant ſub-acrid taſte ſeemingly of the ſubſaline kind. If the juice be ſuffered to ſettle till it becomes clear, it loſes nearly all the ſpecific flavour of the hemlock, the odorous principle ſeeming to ſeparate and ſubſide along with the herbaceous feculencies; the proper menſtruum of this matter is rectified ſpirit of wine, which completely extracts the ſmell, both of the leaves in ſubſtance, and of the inſpiſſated juice, and receives, from both, a green tincture.

This herb is recommended externally, in cataplaſms, fomentations, and plaſters, as a powerful reſolvent and diſcutient. Taken internally, in no great quantity, it has occaſioned diſorders of the ſenſes; ſleep, convulſions, and in ſome inſtances death; and hence it is ranked among the poiſonous plants: Boerhaave tells us, that by the effluvia of the herb, bruiſed and ſtrongly ſmelt to, he became vertiginous. It is ſaid, that to certain brute animals it is innocent; and that its ill qualities are corrected by vinegar or other vegetable acids. Of its effects in ſmall doſes inſufficient to do harm, in which it has been by ſome recommended, nothing material was known, till the happy experiments of Dr. Storck, lately publiſhed, gave room to hope not only that the virtues aſcribed to it in external applications, are better founded than practitioners in general ſeem now to ſuppoſe, but likewiſe that it is a plant of very great importance as an internal medicine.

Dr. Storck relates, that bags of the dry leaves, quilted together, boiled for a few minutes in water, or in milk, where they could not otherwiſe be borne, on account of their ſmell and the itching they produced, then ſqueezed from the ſuperfluous liquid, and applied warm, checked the progreſs of very bad gangrenes, and procured a ſeparation of the corrupted parts: that the ſame application, in a perſon of ſixty who had been gouty for many years, immediately abated the pains, ſoftened and diſcuſſed the tophaceous concretions, and occaſioned the next fit to be milder and of ſhorter continuance: that its effects were likewiſe conſiderable in œdematous tumours, ſchirrhous ſtrumæ, indurations of the glands of the breaſt, and in very bad cancers: that nevertheleſs ſome received from it no benefit, though no one harm: that in inflammations or hot ſerous tumours, it was leſs proper than in the above caſes, or had place only after evacuations; and that plaſters, containing the juice of the hemlock, often reſolve and diſcuſs what reſiſts all other applications. It is in the form of plaſter that this herb, among us, has been chiefly made uſe of: the recent juice is mixed with a ſolution of twice its quantity of gum ammoniacum made in vinegar of ſquills, and the mixture boiled down to a due conſiſtence.

For internal purpoſes, he directs the juice, while freſh, to be inſpiſſated in an earthen veſſel over a very gentle fire, and kept continually ſtirring to prevent its burning, till it acquires the conſiſtence of a thick extract; which is to be mixed with ſo much of the powdered leaves, as will reduce it into a maſs fit for being formed into pills. This preparation, Dr. Storck ſays, was given to a little dog, in the quantity of a ſcruple; taken by himſelf, in doſes of one and two grains, every morning and evening, for ſeveral days; continued by perſons in health, for a year or two; increaſed, in ſome caſes, to a dram and a half in a day, without producing any ill conſequence, or affecting any of the actions, ſecretions, or excretions, of the body. It nevertheleſs had very powerful and ſalutary effects in ſome reputed incurable diſeaſes; acting, though ſlowly and inſenſibly, as a high reſolvent: he relates hiſtories of inveterate ſchirrhuſes, cancers, and the worſt kinds of ulcers and fiſtulæ, being completely cured by it; and ſays it reſolves alſo recent cataracts, or at leaſt reſtrains their progreſs. He begins always with ſmall doſes; giving one pill, of two grains, firſt twice a day, then thrice a day, and gradually increaſing the number to ſix or more for a doſe. The good effects of the medicine were ſometimes viſible in a few days; though the cure generally required ſeveral months. The trials of this medicine made among us, have not, as yet, ſo far as we can learn, been accompanied with ſo much ſucceſs. However, in ſome caſes in which it was applied, it was apparently of great benefit; in ſome, in which it did no ſervice; and in ſome, in which it affected the ſpeech and hearing. It were to be wiſhed, that the author had been more explicit in regard to the preparation of the medicine: for there are grounds to preſume, that its qualities will vary, not a little, according to the ſeaſon or term of age at which the plant is gathered; according as the juice is inſpiſſated entire, or ſuffered previouſly to ſettle; and according to the conſiſtence of the extract requiring a greater or leſs proportion of the leaves in ſubſtance to be mixed. The preparers of the extract in England, have generally depurated the juice; though Dr. Storck's direction of inſpiſſating it, while recent, ſeems to imply that it is to be taken before it has ſuffered any ſeparation of its parts.

The root of hemlock is generally ſuppoſed to be, both in external applications, and when taken internally, of more activity than the leaves. Storck relates, that on being cut, it yields a bitter acrid milk, of which a drop or two, applied to the tip of the tongue, occaſioned a rigidity, pain, and ſwelling of the part, ſo as to prevent ſpeech; and that he was freed from this complaint, by waſhing and rubbing the tongue with citron juice. In drying, it ſeems to loſe of its virulence: he ſays he has taken a grain or two of the powder without injury: there are inſtances of twenty and thirty grains being given, with advantage, in ſchirrhuſes of the liver, &c. in quartan agues on the approach of a fit, and even in acute fevers. Nor does the freſh root appear to be at all times of equal virulence; it having been chewed freely, without any other effect being perceived, than an impreſſion of ſweetiſhneſs reſembling that of parſley roots or carrots: there are inſtances of ſome drams, and even ounces, having been taken, without producing any ill conſequence. So variable does this plant appear to be in its qualities; if really the ſubject of the ſeveral hiſtories was preciſely the ſame ſpecies of plant.

The ſeeds have been recommended by ſome as demulcent, paregoric, and antiphrodiſiac. Of their real qualities, little more is known with certainty, than that they are innocent to ſome kinds of birds. Mr. Ray ſays, he found the crop of a thruſh full of hemlock ſeeds, even at the ſeaſon when corn was plentiful.

Cicuta-Aquatica, long-leaved water hemlock, a poiſonous plant greatly reſembling ſmallage, growing in many meadows and watery places, and which have been too often fatally miſtaken for it.

It differs from ſmallage in the leaves being long, ſlender, and deeply cut, commonly into three ſegments: thoſe of ſmallage are cut in the ſame manner, but the ſegments are ſhort and broad. The roots of this plant are at firſt hollow and green, and lined internally with a ſhining white matter: by age they become harder and more ſolid, and change their green colour to a pale yellowiſh: when full grown, they are as large as the fiſt. They have a number of fibres, like the common celery-root, eſpecially at the bottom, by which they are faſtened to the earth at the bottom of the water wherein they are commonly produced: they are often, however, looſened and carried off by the water; and too often have been taken up and eaten for celery, of which ſeveral melancholy inſtances have happened.

Their poiſonous quality reſides in an orange-yellow juice, which is diſtributed indeed through the whole plant, but accumulated moſt plentifully in the roots.

On a chemical analyſis, both the leaves and roots of this plant are found to contain a large quantity of watery moiſture. Four ounces of the freſh roots were reduced, by drying, to three drams and a half; from which were obtained two drams of ſpirituous and half a dram of watery extract; only one dram of earthy matter remaining from the whole four ounces. The leaves loſt more in drying, and yielded leſs earth than the roots: the quantity of watery extract was two drams from four ounces: the reſiduum gave but half a ſcruple to ſpirit. Sixteen ounces of the leaves yielded in expreſſion ten ounces of juice, which, on being inſpiſſated, left no more than a ſcruple of ſolid matter.

CILIA, the eye-laſhes, in anatomy, are certain rigid hairs ſituated on the arch or tarſus of the eye-lids, and bent in a very ſingular manner.

They are deſtined for keeping external bodies out of the eye, and for moderating the influx of light.

CILIARE, or Ligamentum Ciliare, or Ciliaris Proceſſus, in anatomy, a range of black fibres diſpoſed circularly, having their riſe in the inner part of the uvea, and terminating in the prominent part of the chryſtalline humour of the eye, which they ſurround.

Mr. Mariotte denies the ligamentum ciliare to have any connection with the chryſtalline, or to ſerve for any purpoſes thereof; but Dr. Porterfield, in the Medical Eſſays of Edinburgh, thinks that it accommodates the chryſtalline to the diſtances of objects; from whence he accounts for the phænomena of viſion, as alſo of diſeaſes; as,

1. When the ciliare ligamentum becomes paralytic, no near object will appear diſtinct. 2. If this ligament ſhould be convulſed, no diſtant object will appear diſtinct. 3. If it ſhould be paralytic on one ſide, and ſound on the other, the chryſtalline muſt get an oblique ſituation, when we look at near objects; whence they will not appear diſtinct, unleſs the eye be turned aſide from the object. 4. When this ligament has become rigid and ſtiff, the chryſtalline will have but very little motion, when the limits of diſtinct viſion will be very narrow.

CIMOLIA Terra, in natural hiſtory, a ſpecies of white marle, which is ponderous and friable, and makes a conſiderable efferveſcence with aquafortis.

Cimolia Alba, a name given to the hard, heavy, white clay, whereof tobacco-pipes are made.

CINCHONA, in botany, a genus of plants, the flower of which is monopetalous and infundibuliform; the fruit is a roundiſh bilocular capſule, crowned with a cup, and opening into two parts from the baſe to the apex, containing ſeveral oblong, compreſſed, marginated ſeeds.

This is the tree which produces the quinquina, or Peruvian bark. See the article Quinquina.

CINCTURE, or Ceinture, in architecture, a ring, liſt, or orlo at the top and bottom of the ſhaft of a column, ſeparating the ſhaft at one end from the baſe, and at the other from the capital. See the articles Column and Shaft.

That at bottom is particularly called apophyge, as if the pillar took its riſe from it; and that at top colarin, collar, or collier, and ſometimes annulus. See Apophyge and Colarin.

The cincture is ſuppoſed to be in imitation of the girts or ferrils, which were uſed by the ancients to ſtrengthen and preſerve the primitive wooden columns.

CINERITIOUS, an appellation given to different ſubſtances, on account of their reſembling aſhes, either in colour or conſiſtence: hence it is, that the cortical part of the brain has ſometimes got this epithet. See the article Brain.

CINNABAR, in natural hiſtory, is either native or factitious. The native cinnabar is an ore of quick-ſilver moderately compact, very heavy, and of an elegant ſtriated red colour. In this ore the quickſilver is blended in different proportions with ſulphur. It is ſo rich an ore, as to be no other than mercury impregnated with ſmall quantity of ſulphur, juſt enough to reduce it to that ſtate, being commonly more than ſix parts of mercury to one of ſulphur; and even the pooreſt cinnabar yields one half mercury: it is of a very bright glittering appearance, when freſh broken; and is uſually found lodged in a bluiſh, indurated clay, though ſometimes in a greeniſh talcy ſtone.

For the method of ſeparating mercury from cinnabar, ſee the article MERCURY.

Factitious CINNABAR, a mixture of mercury and ſulphur ſublimed, and thus reduced into a fine red glebe. The beſt is of a high colour, and full of fibres, like needles.

The receipt for making it, according to the late college diſpenſatory, is as follows: Take of purified quickſilver, twenty-five ounces; of ſulphur, ſeven ounces; melt the ſulphur, and ſtir the quickſilver into it while fluid; if it takes fire, let it be immediately extinguiſhed, by covering it with another veſſel. When cold, let it be rubbed into a fine powder. Let this powder be put into a ſubliming veſſel, and ſetting it over a gentle fire, raiſe it by degrees till the whole is ſublimed into a red, ſtriated, heavy maſs, which perfectly reſembles native cinnabar. This, as well as the native cinnabar, is excellent in epilepſies, and in all complaints of the head and nerves. But the factitious is rather to be preferred, as it doth not excite nauſeas, vomitings, and other diſorders which ariſe from vitriolic and perhaps arſenical particles blended by nature among ſome of the maſſes of the native mineral.

Cinnabar is likewiſe uſed by painters as a colour, and is rendered more beautiful, by grinding it with gum-water and a little ſaffron.

There is likwiſe a blue cinnabar, made by mixing two parts of ſulphur with three of quickſilver and one of ſal armoniac.

CINNABAR *of Antimony*, a preparation of mercury, ſulphur, and antimony, made by ſublimation, ſaid to be a good diaphoretic and alterative. See the article ANTIMONY.

CINNAMON, *Cinnamomum*, the bark of a tree of the bay kind, growing in the iſland of Ceylon; freed from the outer green or greyiſh part, and cut into long ſlices, which curl up, in drying, into quills or canes, the form in which it is brought to us; very thin, light, of a reddiſh yellow colour, or pale ruſty iron colour, ſomewhat tough in breaking, and of a fibrous textue like wood. It is frequently mixed with another bark, greatly reſembling it in appearance, but much weaker in virtue, *caſſia lignea*: this laſt is diſtinguiſhed by the cloſe ſmooth ſurface which it exhibits on being broken, and by its remarkably ſlimy taſte.

This bark is one of the moſt grateful of the aromatics; of a very fragrant ſmell, and a moderately pungent, glowing, but not fiery taſte, accompanied with a conſiderable ſweetneſs, and ſome degree of aſtringency. It is ſaid, that the fine flavour reſides, originally, only in the thin pellicle which lines the interior ſurface of the bark, and which abounds with veſicles of eſſential oil; the reſt of the bark, while freſh, being merely ſubaſtringent, and receiving the flavour, which we find it to have, from the inner pellicle in drying. Accordingly the thinneſt pieces are found to be ſtrongeſt; as containing the largeſt proportion of this active part, and the leaſt of the inert woody matter.

Cinnamon, infuſed in boiling water in a cloſe veſſel, gives out to the fluid greateſt part of its virtue; together with a reddiſh brown tincture, deeper or paler, according to the proportion of cinnamon employed. Rectified and proof ſpirit extract its virtues more perfectly than water, and without the aſſiſtance of heat; three ounces of the powdered bark, by cold maceration for a few days, give a ſtrong impregnation to a quart of proof ſpirit.

The aromatic principle of this ſpice is an eſſential oil; which, in diſtillation with water, riſes ſlowly and difficultly, and renders the liquor ſomewhat milky: the water continues to run milky, and gratefully impregnated with the fragrance of the cinnamon, till about a gallon has been drawn off from a pound: when large quantities of the ſpice are ſubmitted to the operation at once, a ſmall portion of the oil commonly ſeparates and ſinks to the bottom of the water; in colour gold yellow, of a delightful ſmell like that of cinnamon itſelf; and of a fiery pungency, ſo as not to be ſafely taſted or applied to the ſkin without dilution; for, as Boerhaave obſerves, it burns to a gangrenous eſchar: in doſes of a drop or two, diluted by the means of ſugar, mucilages, &c. it is one of the moſt immediate cordials and reſtoratives, in languors, ſingultuſes, and all debilities of the vis vitæ. If the milky diſtilled water be long kept, great part of the ponderous oil ſuſpended in it, ſeparates and ſubſides: ſome with a view to the perfection of the water, endeavour to prevent this ſeparation, by adding a ſmall proportion of ſugar, which contributes to keep the oil diſſolved: others, with a view only to the obtaining of the oil, endeavour to promote the ſeparation, by ſetting the liquor in a very cold place, and perhaps by other means not commonly known. It is ſaid, that from ſixteen ounces of good cinnamon, about two drams of oil may be collected.

The watery decoction remaining after the diſtillation, yields, on being inſpiſſated, a mildly aſtringent maſs, which has nothing of the ſweetneſs, any more than of the peculiar flavour of the cinnamon. It is obſervable, that this extract is free from the nauſeous reliſh which moſt of the other ſpices diſcover, in a greater or leſs degree, when diveſted by the ſame means of their proper aromatic matter.

Rectified ſpirit, diſtilled from cinnamon, brings over very little of its flavour. An extract, made by this menſtruum, retains nearly all the valuable parts of the ſpice, the ſweet aromatic matter as well as the reſtringent: it has a durable and very grateful warmth and pungency, not a fiery heat like the ſpirituous extracts of many other ſpices; the heat and pungency of cinnamon reſiding in the pure eſſential oil. The quantity of this extract is about one ſixth of that of the cinnamon employed.

On diſtilling proof-ſpirit from this ſpice, the purely ſpirituous part, which comes over firſt, proves almoſt flavourleſs, but the watery part which follows brings with it the eſſential oil; and this oil being diſſolved by means of the ſpirituous portion, the liquor proves limpid. A cordial water of this kind is commonly prepared in the ſhops, by drawing off a gallon of proof-ſpirit from a pound of cinnamon. A like preparation might be obtained rather more advantageouſly, and free from the foreign flavour which the common proof-ſpirits are accompanied with, by adding to the ſimple water a ſuitable quantity of pure rectified ſpirit.

Some other products of the cinnamon tree are uſed medicinally in the Eaſtern countries, and have been ſometimes, though very rarely, brought into Europe; to wit, an aromatic eſſential oil diſtilled from the roots, and a ſpecies of camphor which ſeparates from this oil on rediſtilling it; an oil drawn from the leaves, ſimilar in flavour to the genuine oil of cloves, with a little admixture of that of the cinnamon bark; and a whitiſh ſebaceous matter, ſaid to reſemble the expreſſed oil of nutmegs, obtained either by expreſſion or by coction in water from the fruit.

White CINNAMON, called alſo winter's bark, is the bark of a tree frequent in the iſlands of St. Domingo, Guadalupe, &c. of a ſharp biting taſte like pepper. Some uſe it inſtead of nutmeg; and in medicine it is eſteemed a ſtomachic and antiſcorbutic. See WINTERANUS *Cortex*.

CINQUEFOIL, *Quinquefolium*, in botany, the ſame with the potentilla of Linnæus. See the article POTENTILLA.

Cinquefoil roots are eſteemed drying, aſtringent, and antifebrific; and accordingly have been preſcribed with ſucceſs in agues, and fluxes of all kinds.

CINQUE-PORTS, an appellation given to five port-towns, ſituated on the coaſt of Kent and Suſſex, over-againſt France, and famous in Engliſh hiſtory.

The cinque-ports are Haſtings, Dover, Hithe, Romney, and Sandwich; which had large privileges granted them, on account of their former great importance, being then not only the keys of the kingdom, but conſiderable for their maritime ſtrength: thus we are told, that they were obliged to provide eighty ſhips at their own charge, for forty days, as often as the king ſhould have occaſion in his wars.

Cinque-Port is alſo a particular kind of fiſhing-net, much uſed in ſtanding water; ſo called on account of the five entrances into it.

CION, or **Cyon**, among gardeners, denotes a young ſprig, or ſprout of a tree.

Cion, in anatomy, a name ſometimes uſed for the uvula. See the article Uvula.

CIPHER, or **Cypher**, one of the Arabic characters, or figures, uſed in computation, formed thus 0.

A cypher of itſelf ſignifies nothing; but when placed to the right of other characters, in whole numbers, it augments their value ten times; and when placed to the left in decimal arithmetic, it leſſens the value in each figure in the ſame proportion.

Cipher is alſo a kind of enigmatic character, compoſed of ſeveral letters interwoven, which are generally the initial letters of the perſon's names for whom the ciphers are intended.

Theſe are frequently uſed on ſeals, coaches, and other moveables. Merchants likewiſe, inſtead of arms, bear a cipher, or the initial letters of their names interwoven about a croſs, of which we have many inſtances on old tombs.

Cipher denotes likewiſe certain characters diſguiſed and varied, uſed in writing letters that contain ſome ſecret, not to be underſtood but by thoſe between whom the cipher is agreed on.

There are ſeveral kinds of ciphers, according to lord Bacon; as the ſimple, thoſe mixed with non-ſignificants, thoſe conſiſting of two kinds of characters, wheel ciphers, key-ciphers, &c. They ought all to have theſe three proportions; 1. They ſhould be eaſy to write and read. 2. They ſhould be truſty and undecipherable. And, 3. Clear of ſuſpicion.

There is a new way of eluding the examination of a cipher, viz. to have two alphabets, the one of ſignificant, and the other of non-ſignificant letters; and folding up two writings together, the one containing the ſecret, while the other is ſuch as the writer might probably ſend without danger: in caſe of a ſtrict examination, the bearer is to produce the non-ſignificant alphabet for the true, and the true for the non-ſignificant, by which means the examiner would fall upon the outward writing, and, finding it probable, ſuſpect nothing of the inner. No doubt the art of ciphering is capable of great improvement. It is ſaid that king Charles I. had a cipher, conſiſting only of a ſtraight line differently inclined: and there are ways of ciphering by the mere punctuation of a letter, whilſt the words of a letter ſhall be non-ſignificants, or ſenſe that leaves no room for ſuſpicion. Thoſe who deſire a fuller explanation of ciphering, may conſult Bacon, where they will find a cipher of his invention; biſhop Wilkins's Secret and Swift Meſſenger; and Mr. Falconer's Cryptomenyſis Patefacta.

CIPPUS, in antiquity, a low column, with an inſcription, erected on the high roads, or other places, to ſhew the way to travellers, to ſerve as a boundary, to mark the grave of a deceaſed perſon, &c.

CIRCELLIONES, in church hiſtory, the ſame with the agoniſtici. See the article Agonistici.

CIRCENSIAN Games, *Circenſes Ludi*, a general term, under which was comprehended all combats exhibited in the Roman circus, in imitation of the Olympic games in Greece. Moſt of the feaſts of the Romans were accompanied with Circenſian games; and the magiſtrates, and other officers of the republic, frequently preſented the people with them, in order to procure their favour. The grand games were held for five days, commencing on the 15th of September. There were ſix kind of games exhibited: the firſt was wreſtling, and fighting with ſwords, with ſtaves, and with pikes; the ſecond was racing; the third, *ſaltatio*, leaping; the fourth, *diſci*, quoits, arrows, and ceſtus; all which were on foot; the fifth was horſe-courſing; the ſixth, courſes of chariots, whether with two horſes or with four.

CIRCLE, in geometry, a plane figure, comprehended under one ſingle line, which returns into itſelf, having a point in the middle, from which all the lines drawn to its circumference are equal. Properly ſpeaking it is the ſpace included within the circumference, or periphery, that is in the circle: though in the popular uſe of the world, circle is frequently uſed for the periphery alone. Every circle is ſuppoſed to be divided into 360 equal parts called degrees.

The circle is the moſt capacious of all figures, containing the greateſt area under the leaſt bounds.

The area of a circle is found by multiplying the periphery by the fourth part of the diameter, or half the periphery by half the diameter.

Circles, and their inſcribed ſimilar figures, are always as the ſquares of the diameters: ſo that they are in a duplicate ratio of their diameters, and conſequently of their radii.

A circle is equal to a triangle, whoſe baſe is equal to the periphery, and its altitude to the radius. Circles therefore are in a ratio compounded of the peripheries and the radii.

The method of finding the circumference of a circle from its diameter, or radius, being given, is one of the moſt uſeful problems in geometry.

The ancients had a method of ſolving this noble propoſition, by a continual biſection of the ſides of the inſcribed polygons, till they arrived at a ſide ſubtending an exceeding ſmall arch; they likewiſe found the ſide of a ſimilar circumſcribed polygon: then multiplying each of theſe by the number of ſides of the polygon, they obtained the periphery of each polygon. The ratio of the diameter to the periphery of the circle will be greater than that of the ſame diameter to the perimeter of the circumſcribed polygon, but leſs than that of the inſcribed polygon.

The difference of the two being known, the ratio of the diameter to the periphery is eaſily had in numbers very nearly true, though not juſtly ſo.

But as this method was attended with frequent involutions and extractions of roots of very large numbers, the greateſt mathematicians have endeavoured to find ſhorter and eaſier methods of obtaining the circle's periphery. The moſt direct and eaſieſt way is by the help of fluxions, and infinite ſeries, as will evidently appear from what follows.

Becauſe the fluxion of the arch is to the fluxion of its tangent in the duplicate ratio of the radius to the ſecant, it is evident that if the radius be a, the tangent x, and conſequently the ſecant $\sqrt{a^2+x^2}$, the fluxion of the arch will be equal to $\frac{a^2\dot{x}}{a^2+x^2}$; this being put into an infinite ſeries, and the fluent of every term found, will give $x - \frac{x^3}{3a^2} + \frac{x^5}{5a^4} - \frac{x^7}{7a^6}$, &c. or $x \times \overline{1 - \frac{x^2}{3a^2} + \frac{x^4}{5a^4} - \frac{x^6}{7a^6}}$, &c. Let us now ſuppoſe x to be the tangent of an arch of 30°. in which caſe the tangent x is to the ſecant $\sqrt{a^2+x^2}$ as 1 to 2, and conſequently x to a as 1 to $\sqrt{3}$; ſo that the arch of 30°, is the product of $\frac{a}{\sqrt{3}}$ multiplied by the ſeries $1 - \frac{1}{9} + \frac{1}{45} - \frac{1}{189} + \frac{1}{729}$, &c. and the whole circumference to the diameter as $\sqrt{12}$ multiplied by this ſeries to unity. This ſeries may be repreſented by $1 - \frac{1}{3\times3} + \frac{1}{5\times9} - \frac{1}{7\times27} + \frac{1}{9\times81} - \frac{1}{11\times243}$, &c. *Hence* by taking a few terms of this ſeries, we ſhall have the periphery of a circle, whoſe diameter is 1. equal to 3.14159265354+

The impoſſibility of expreſſing the exact proportion of the diameter of a circle to its circumference, by any received way of notation, and the abſolute neceſſity of having it as near the truth as poſſible, has put ſome of the moſt celebrated men in all ages upon endeavouring to approximate it. The firſt who attempted it with ſucceſs, was the celebrated Van Culen, who by the ancient method, though ſo very laborious, carried it to thirty-ſix decimal places: theſe he ordered to be engraven on his tomb-ſtone, thinking he has ſet bounds to farther improvements. However, the indefatigable Mr. Abraham Sharp carried it to ſeventy-five places in decimals, and ſince that, the learned Mr. John Machin has carried it to one hundred places, and is as follows.

If the diameter of a circle be 1, the circumference will be 3.14159265358979323846264338327950288419716939937510582097494459230781640528620899862803482534211706 79, + of the ſame parts; which is a degree of exactneſs far ſurpaſſing all imagination.

But the ratios generally uſed in practice are as 7 to 22, as 106 to 333, as 113 to 355, as 1702 to 5347, as 1815 to 5702, or as 1 to 3.14159.

Since, when the diameter of a circle is 1, the circumference will be 3.1415926536— of the ſame parts; and ſince all circles are ſimilar figures, it will be

1. As 1, to 3.1415926536—, ſo is the diameter of a circle to its circumference: wherefore, if the diameter of any circle be multiplied by 3.1415926536—, the product will be the length of the circumference in the ſame parts.

2. As 3.1415926536— to 1, or as 1 to .3183098862—, ſo is the circumference of a circle to its diameter: wherefore, if the circumference of any circle be divided by 3.1415926536—, or multiplied by its reciprocal .3183098862—, the former quotient, or the latter product, will give the diameter.

Circle *Equant*, in the Ptolemaic aſtronomy, a circle deſcribed on the center of the equant. Its chief uſe is to find the variation of the firſt inequality.

Circle *of perpetual Apparition*. See Apparition.

Circle *of perpetual Occultation*, is a leſſer circle of the ſphere parallel to the equator, being deſcribed by any point of the celeſtial ſphere which touches the ſouthern part of the horizon: all the ſtars that are included within this circle never riſe.

Circles *of Declination on the Globe*; ſo ſome call the meridians on which the declination or diſtance from the equator of any planet or ſtar is accounted.

Circles *of Longitude on the Globe*, are great circles paſſing through the ſtar and the pole of the ecliptic; they determine the ſtar's longitude, reckoned from the beginning of Aries. On theſe circles are accounted the latitude of the ſtars.

Circles *of Poſition* are circles paſſing by the common interſections of the horizon and meridian, and through any degree of the ecliptic, or the center of any ſtar or other point in the heavens; and are uſed for the finding out the ſituation or poſition of any ſtar, &c.

Circles *of the Sphere*. See Sphere.

Arctic **Circles**. See Polar *Circles*.

Vertical **Circles** are great circles of the ſphere, interſecting each other in the zenith and nadir; theſe cut the horizon at right angles.

CIRCUITORES, in church hiſtory, the ſame with the agoniſtici. See the article Agonistici.

CIRCULAR, in a general ſenſe, any thing that is deſcribed or moved in a round, as the circumference of a circle, or ſurface of a globe.

The circular form is of all others the beſt diſpoſed for motion, and the moſt capacious.

Circular Letter, a letter directed to ſeveral perſons who have the ſame intereſt in ſome common affair.

Circular Lines, in mathematics, ſuch ſtraight lines as are divided from the diviſions made in the arch of the limb, ſuch as ſines, tangents, ſecants, chords, &c. See the articles Sine and Tangent.

Circular Numbers, called alſo ſpherical ones, according to ſome, are ſuch whoſe powers terminate in the roots themſelves.

Thus, for inſtance, 5 and 6, all whoſe powers end in 5 and 6, as the ſquare of 5 is 25, the ſquare of 6 is 36, &c.

Circular Sailing is the method of ſailing by the arch of a great circle. See the article Sailing.

Circular Velocity, in the new aſtronomy, ſignifies the velocity of any planet, or revolving body, which is meaſured by the arch of a circle.

CIRCULATION, the act of moving round, or in a circle: thus we ſay, the circulation of the blood, the circulation of the ſap, &c.

Circulation *of the Blood*, the natural motion of the blood in a living animal, whereby that fluid is alternately carried from the heart into all parts of the body, by the arteries, from whence it is brought back to the heart again by the veins.

This motion is chiefly cauſed by the dilatation and contraction of this organ, and is the principle on which life depends; for when it ceaſes in any part, that part dies; when it is diminiſhed, the operations are weak; and when it ceaſes totally, life is extinguiſhed.

All the veins diſcharge themſelves into the ventricles of the heart; from hence all the arteries ariſe: the blood expelled out of the right ventricle muſt be carried, thro' the pulmonary artery, into the lungs; from which it muſt be returned, by the pulmonary veins, to the left ventricle; from the left ventricle the blood thus imported is, by the conſtriction of that part, again expelled into the aorta, and by it diſtributed all over the reſt of the body, and thence is returned again to the right ventricle by the cava, which completes the circulation.

This circulation becomes actually viſible, with the aſſiſtance of a microſcope, eſpecially in fiſh, frogs, &c. wherein the inoſculation, or union of the extremities of the arteries with thoſe of the veins, together with the globules of the blood flowing from the one into the other, may be plainly ſeen.

The reaſons enforcing the neceſſity of circulation of the blood, are as follow.

1. All the blood of a living animal, upon wounding any of the larger arteries, is evacuated in a little time, and that with a conſiderable force: whence it follows, that the blood has a paſſage from every part of the animal body into every artery; and if the whole maſs of blood be found to move upon this occaſion, it is evident it muſt have moved before.

2. The great quantity of blood that is driven out of the heart into the arteries at every pulſation, makes a circulation neceſſary; for tho' the ancients, who knew not this circulation, imagined that only a drop or two was expelled at every ſyſtole, which they were neceſſitated to ſuppoſe, to avoid the great diſtention that the arteries muſt be liable to, if any conſiderable quantity iſſued into them, yet it is certain and demonſtrable, that an ounce, or more, muſt be driven into them each time; and yet ſome compute there are five or ſix thouſand pulſations in an hour.

3. A third argument may be taken from the valves in the veins, which are ſo formed, that blood may freely paſs through them, out of the leſſer veins into the greater, and ſo into the cava; but, on the contrary, not out of the greater into the leſs; even if one blow into the cava, through a pipe, there will no wind paſs into the ſmaller veins; but, on the other hand, if you blow up the leſſer veins, the wind will readily paſs to the larger, and ſo to the cava.

4. Any of the arteries being tied up with a fillet, ſwell, and beat between the bandage and the heart, but they grow flaccid between the bandage and the extremities of the body: then, if the artery be cut between the bandage and the heart, blood ſtreams out even to death; but if it be cut between the bandage and the extremities of the body, the quantity of blood it yields is very ſmall.

5. Any of the larger veins being tied up with a fillet, as in the letting of blood in the arm or foot, then the vein below the ligature will preſently fill and grow tumid, but above it will preſently fall and diſappear: the reaſon of which muſt needs be, that the blood being driven along the arteries, towards the extreme parts, returns by the veins, and aſcends upwards, which coming to the ligature, and being ſtopt there, ſwells the vein below the ligature, and ſpurts out as ſoon as an orifice is made; but when the fillet is looſed again, the blood flows no longer out thereat, but holds on its wonted channel, and the vein and the orifice cloſes up again.

From the whole it is evident that all the arteries of the body are continually bringing the blood from the left ventricle of the heart, thro' the trunks of the arteries, into the branches, and from thoſe to all parts of the body; and, on the contrary, that all the veins, except the porta, are perpetually bringing back the blood from the extreme parts into the ſmaller branches: from theſe it paſſes into the larger, at length into the trunks, and thence into the cava, and through the ſinus venoſus into the heart, where being arrived, its motion or circulation is continued in the following manner:

The auricles of the heart being large hollow muſcles, furniſhed with a double ſeries of ſtrong fibres, proceeding with a contrary direction to the oppoſite tendous, the one adhering to the right ventricle, the other to the ſinus venoſus; as alſo with innumerable veins and arteries: by the contractile force of theſe auricles, the blood will be vigorouſly expelled and driven into the right ventricle, which, upon this contraction, is rendered flaccid, empty, and diſpoſed to admit it.

Now, if the right ventricle, thus full of blood, by the contraction of its fibres, preſs the blood towards the aperture again, the venous blood at the ſame time pouring in, will drive it back again into the cavity, and mix it more intimately, till forcing up againſt the parietes, it raiſe the valvulæ tricuſpides, which are ſo connected with the fleſhy columns extended on the oppoſite ſide, as that, when laid quite down, they cannot cloſe the parietes of the right ventricle; theſe it thruſts towards the right auricle, till being there joined, they ſtop the paſſage very cloſely, and prevent any return.

By the ſame means the ſame blood riſes into the three ſemilunar valves, placed in the extremity of the other mouth, and lying open to the pulmonary artery; theſe it ſhuts cloſe againſt the ſides of the artery, and leaves a paſſage into the artery alone: the blood carried by this artery into the lungs, and diſtributed by its branches through the whole ſubſtance thereof, is firſt admitted into the extremities of the pulmonary vein, called arteria venoſa, whence paſſing into four large veſſels, which unite together, it is brought to the left ſinus venoſus, or trunk of the pulmonary vein, by the force of whoſe muſculous ſtructure, it is driven into the left ventricle, which, on this occaſion, is relaxed, and by that means prepared to receive it.

Hence, as before, it is driven into the left ventricle, which is relaxed by the ſame means; and by the valvulæ mitrales opening, admit it into the left ventricle, and hinder its flux into the pulmonary vein; from hence it is forced into the aorta, at whoſe orifice there are three ſemi-lunar valves, which alſo prevent a reflux, by cloſing the paſſage.

The motion of the blood in living animals is attended with the following phænomena: 1. Both the venous ſinuſes are filled, and grow turgid at the ſame time. 2. Both auricles grow flaccid at the ſame time, and both are filled at the ſame time with blood, impelled by the contractile force of its correſpondent muſcular venous ſinus. 3. Each ventricle contracts and empties itſelf of blood at the ſame time; and the two great arteries are filled and dilated at the ſame time. 4. As ſoon as the blood, by this contraction, is expelled, both ventricles being empty, the heart grows larger and broader. 5. Upon which the muſcular fibres of both venous ſinuſes contract, and expel the blood contained in them, into the ventricle of the heart. 6. In the mean time the venous ſinuſes are again filled, as before, and the auricles, &c. return into their former habitude. 7. This alteration continues till the animal begins to languiſh under the approach of death, at which time the auricles and venous ſinuſes make ſeveral palpitations for one contraction of the ventricle.

In a fœtus, the apparatus for the circulation of the blood is ſomewhat different from that in adults, as above deſcribed. The ſeptum, which ſeparates the two auricles of the heart, is pierced through with an aperture, called the foramen ovale, and the trunk of the pulmonary artery, a little after it has left the heart, ſends out a tube into the deſcending aorta, called the communicating canal. The fœtus being born, the foramen ovale cloſes by degrees, and the canal of communication dries up, and becomes a ſimple ligament. Dr. Nichols, late lecturer of anatomy at Oxford, has, in his Compend. Anatom. contradicted the common received doctrine of the motion of the heart, and of the circulation of the blood, both in adults and fœtuſes: he maintains, that the circulation of the blood depends on ſix motions: 1. Of the right auricle. 2. Right ventricle. 3. Pulmonary artery. 4. Left auricle. 5. Left ventricle. And, 6. Of the aorta. Of theſe, the firſt, third, and fifth, are ſynchronous, or act at the ſame time; as the ſecond, fourth, and ſixth, likewiſe do; but the firſt, third, and fifth, are aſynchronous, or act at a different time from what the ſecond, fourth, and ſixth do, and therefore

The 2 auricles
The 2 ventricles } are alternately relaxed and contracted.
The 2 arteries

Concerning the circulation of the blood in fœtuſes, the doctor has the following propoſitions.

1. The blood of the aſcending cava is fitter for nutrition, muſcular motion, and the ſubtile ſecretions, than the blood that is carried to the heart by the deſcending cava.

2. The aſcending and deſcending aorta are dilated and contracted at different times, or have aſynchronous motions.

3. The blood of the aſcending cava is puſhed to the heart at the time when the right auricle is contracted, and the auricle is relaxed; and therefore it will not paſs into the right auricle, and from that into the left, but muſt go immediately from the cava into the left auricle.

4. The blood which is ſent from the left auricle into the left ventricle, conſiſting moſtly of the blood of the aſcending cava, is wholly diſtributed into the heart and branches of the aſcending aorta.

5. The blood which flows from the deſcending cava into the heart, paſſes partly through the lungs into the left auricle, to be mixed with the blood of the aſcending cava; partly paſſes into the deſcending aorta, not to be mixed with the blood of the aſcending artery, that the blood which is returned to the mother may be venous, weak, and poor *(effætus)*.

6. The canalis arterioſus being ſhut by reſpiration, the deſcending artery requires a motion ſynchronous to that of the aſcending artery; and the blood of the aſcending cava is ſent to the heart at the time when the left auricle is contracted, and the right auricle relaxed, and therefore is wholly poured into the right ventricle, along with the blood of the deſcending cava.

7. The contents of the abdomen being preſſed by reſpiration, the umbilical arteries, umbilical veins, and the ductus venoſus, are ſhut up.

8. The uſual crying of new-born infants contributes much to the diſtention of the lungs, and breaking down the particles of blood.

As to the velocity of the circulating blood, and the time wherein the circulation is completed, ſeveral computations have been made. By Dr. Keil's account, the blood is driven out of the heart into the aorta with a velocity which would carry it twenty-five feet in a minute: but this velocity is continually abated in the progreſs of the blood, in the numerous ſections or branches of the arteries; ſo that before it arrives at the extremities of the body, its motion is infinitely diminiſhed. The ſpace of time wherein the whole maſs of blood ordinarily circulates, is variouſly determined: ſome ſtate it thus, ſuppoſing the heart to make two thouſand pulſes in an hour, and that at every pulſe there is expelled an ounce of blood; as the whole maſs of blood is not ordinarily computed to exceed twenty-four pounds, it muſt be circulated ſeven or eight times over in the ſpace of an hour.

The circulation of the blood is generally ſaid to have been firſt diſcovered in England, in the year 1628, *by* Dr. Harvey, an ingenious and learned phyſician; though there are others who contend for the glory of this moſt important diſcovery. Leonicenus ſays, that Fran. Paoli Sarpi, a Venetian, diſcovered the circulation, but durſt not publiſh his diſcovery for fear of the inquiſition; that he therefore only communicated the ſecret to Fab. ab. Aquapendente, who, after his death, depoſited the book he had compoſed on it, in the library of St. Mark, where it lay a long time, till Aquapendente diſcovered the ſecret to Harvey, who then ſtudied under him at Padua, and who upon his return to England, a land of liberty, publiſhed it as his own. But Sir George Ent has ſhewn, that father Paul received the firſt notion of the circulation of the blood from Harvey's book on that ſubject, which was carried to Venice by the ambaſſador of the republic at the court of England.

The circulation of the blood was altogether unknown to the ancients: they thought that all the blood came from the liver, and that the greateſt part of it paſſed into the vena cava, and ſo into all the branches belonging to it; but in ſuch a manner, that, in coming out from the liver, a conſiderable quantity of it turns about, and enters into the right cavity of the heart, where it is divided into two parts, one of which runs through the vena arterioſa, into the lungs, and the other through the medium ſeptum into the left cavity; where they ſay it is converted into arterial blood, or vital ſpirits, which is carried into the lungs by the arteria venoſa, and all over the body by the arteria magna and its branches.

Circulation *of the Sap of Vegetables* is a natural motion of the nutritious juice of plants from the root to the extreme parts, and thence back again to the root.

That there is a circulation in the bodies of vegetables ſeems to be evinced by the experiments of modern naturaliſts and gardeners, by means of certain veſſels analogous to the veins and arteries in animals.

Circulation, in chemiſtry, is an operation whereby the ſame vapour, raiſed by fire, falls back, to be returned and diſtilled ſeveral times, and thus reduced into its moſt ſubtile parts.

Circulation is performed by diſpoſing the liquor in a ſingle veſſel, ſtopped at top, and called a pelican; or in a double veſſel, conſiſting of two pieces, luted on each other; the lower to contain the liquor, and its vapours. It is performed either by the heat of a lamp, or that of aſhes or of ſand moderately hot; or in dung, or by the ſun. It uſually demands a continued heat of ſeveral days, ſometimes of ſeveral weeks, or even ſeveral months. By circulation the fineſt part of the fluid mounts to the top of the veſſel, and finding no iſſue there, falls back again, and rejoins the matter at bottom, whence it aroſe.

CIRCULUS, in chemiſtry, an iron inſtrument in form of a ring, which being heated red hot, and applied to the necks of retorts and other glaſs veſſels, till they grow hot, a few drops of cold water thrown upon them, or a cold blaſt, will make the necks fly regularly and evenly off.

Another method of doing this, is to tie a thread, firſt dipt in oil of turpentine, round the place where you would have it break; and then ſetting fire to the thread, and afterwards ſprinkling the place with cold water, the glaſs will crack exactly where the thread was tied.

CIRCUMAGENTES Musculi, or Obliqui Musculi, in anatomy, are certain oblique muſcles of the eyes, ſo called from helping to wind and turn the eyes about.

Theſe muſcles, called alſo the oblique muſcles of the eye, or the rotatores, are two, a larger and a ſmaller: the larger, ariſing near the interior adducens, paſſes through a ſingular trochlea, of an almoſt cartilaginous ſtructure, near the canthus of the eye; from thence it turns back, and is inſerted into the upper part of the eye, near its middle; hence it obliquely depreſſes the pupil, and in ſome degree draws it outward.

The leſſer ariſes from the anterior and inner part of the orbit, not far from the naſal canal; it ſurrounds obliquely the lower part of the bulb, and is inſerted into its exterior part, near the middle; hence it moves the pupil of the eye obliquely upwards: both theſe obliqui acting together, draw the eye forwards; and thus they are antagoniſts of the recti, which draw it backwards.

CIRCUMAMBIENT, an appellation given to a thing that ſurrounds another on all ſides; chiefly uſed in ſpeaking of the air. See the article Air.

CIRCUMCISION, the act of cutting off the prepuce; or a ceremony in the Jewiſh and Mahometan religions, wherein they cut off the fore-ſkin of their males, who are to profeſs the one or the other law.

Circumcision is alſo the name of a feaſt, celebrated on the firſt of January, in commemoration of the circumciſion of our Saviour.

CIRCUMFERENCE, in a general ſenſe, denotes the line or lines bounding a plane figure. However, it is generally uſed in a more limited ſenſe, for the curve line which bounds a circle, and otherwiſe called a periphery; the boundary of a right-lined figure being expreſſed by the term perimeter.

Any part of the circumference is called an arch, and a right line drawn from one extreme of the arch to the other, is called a chord.

The circumference of every circle is ſuppoſed to be divided into 360 degrees. The angle at the circumference of a circle is double that at the center. See Angle.

For the ratio of the circumference of a circle to its radius, ſee the article Circle.

CIRCUMFERENTOR, an inſtrument uſed by ſurveyors for taking angles.

It conſiſts of a braſs index and circle, all of a piece. The index is commonly about fourteen inches long, and an inch and a half broad; the diameter of the circle is about ſeven inches. On this circle is made a chart, whoſe meridian line anſwers to the middle of the breadth of the index, and is divided into three hundred and ſixty degrees (ſee plate XXXVII. *fig.* 10.) There is a braſs ring ſodered on the circumference of the circle, on which ſcrews another ring, with a flat glaſs in it, ſo as to form a kind of box for the needle, ſuſpended on the pivot in the center of the circle. There are alſo two ſights to ſcrew on, and ſlide up and down the index; as alſo a ſpangle and ſocket ſcrewed on the back-ſide of the circle for putting the head of the ſtaff in.

How to obſerve the Quantity of an Angle by the Circumferentor.

Let it be required to find the quantity of the angle E K G (plate XXXVII. *fig.* 11.) firſt, place your inſtrument at K, with the flower-de-luce of the chart towards you; then direct your ſights to E, and obſerve what degrees are cut by the ſouth-end of the needle, which let be 296; then, turning the inſtrument about, direct your ſights to G, noting then alſo what degrees are cut by the ſouth end of the needle, which ſuppoſe 247. This done, always ſubtract the leſſer from the greater, as in this example, 247 from 296, the remainder is 49 degrees, which is the true quantity of the angle E K G.

CIRCUMFLEX, in grammar, one of the accents. See the article Accent.

CIRCUMGYRATION, denotes the whirling motion of any body round a center: ſuch is that of the planets round the ſun.

CIRCUMINCESSION, in theology, a term whereby the ſchoolmen uſed to expreſs the exiſtence of three divine perſons in one another, in the myſtery of the Trinity.

CIRCUMLOCUTION, a paraphraſtical method of expreſſing ones thoughts, or ſaying that in many words, which might have been ſaid in few.

Circumlocution, in oratory, is the avoiding of ſomething diſagreeable, or inconvenient to be expreſſed in direct terms, by imitating the ſenſe thereof in a kind of paraphraſe, ſo conceived as to ſoften and break the force thereof.

CIRCUM-POLAR Stars, an appellation given to thoſe ſtars, which by reaſon of their vicinity to the pole, move round it without ſetting.

CIRCUMSCRIBED, in geometry, is ſaid of a figure which is drawn round another figure, ſo that all its ſides or planes touch the inſcribed figure.

Circumscribed Hyperbola, one of Sir Iſaac Newton's hyperbolas of the ſecond order, that cuts its aſymptotes, and contains the parts cut off within its own ſpace.

CIRCUMSCRIBING, in geometry, denotes the deſcribing a polygonous figure about a circle, in ſuch a manner, that all its ſides ſhall be tangents to the circumference.

Sometimes the term is uſed for the deſcribing a circle about a polygon, ſo that each ſide is a chord; but in this caſe it is more uſual to ſay the polygon is inſcribed, than the circle is circumſcribed.

CIRCUMSCRIPTION, in natural philoſophy, the termination, bounds, or limits of any natural body.

CIRCUMSPECTE AGATIS, in law, a ſtatute preſcribing certain caſes to the judges, wherein the king's prohibition does not lie.

CIRCUMSTANCE, a particularity which, though not eſſential to any action, yet doth ſome way affect it.

Some circumſtances are reckoned purely phyſical, not connecting any moral good or evil with any action; ſuch as killing a man with the right or left hand, &c. others are accounted properly moral, becauſe they do really influence our actions, and render them more good or evil than they would have been without ſuch circumſtances. Divines ſay, that the converſion of a ſinner depends on a certain aſſemblage and certain management of external circumſtances, in the midſt whereof he is placed; which arrangement of circumſtances depends on the providence of God, whence converſion alſo depends on him.

The writers of ethics ſum up all the circumſtances of the actions of men in this one verſe.

Quis, quid, ubi, quibus auxiliis, cur, quomodo, quando.

CIRCUMSTANTIA, in medicine, comprehends whatever is not eſſentially connected with the principal indicant.

CIRCUMSTANTIBUS, in law, a term uſed for ſupplying and making up the number of jurors, in caſe any impannelled appear not, or appearing, are challenged by either party, by adding to them ſo many of the perſons preſent, as will make up the number, in caſe they are properly qualified.

CIRCUMVALLATION, or *Line of* CIRCUMVALLATION, in the art of war, is a trench bordered with a parapet, thrown up quite round the beſiegers camp, by way of ſecurity againſt any army that may attempt to relieve the place, as well as to prevent deſertion.

This trench ought to be at the diſtance of cannon ſhot from the place: it is uſually twelve feet broad, and ſeven deep; and at ſmall diſtances is flanked with redoubts, and other ſmall works, or with field forts, raiſed on the moſt proper eminences. It ought never to be drawn at the foot of a riſing ground, leſt the enemy, ſeizing on the eminence, ſhould erect batteries of cannon there, and ſo command the line. See plate V. *fig.* 1 and 2, where *a, a,* &c is the line of circumvallation. *c, c,* the ditch. *b, b,* paſſages into the ditch. *d, d,* advanced ditch. P, P, profile of the ſame line. A, parapet. B, ditch. C, C, paſſages into the ditch. D, advanced ditch.

CIRCUMVOLUTION, in architecture, denotes the torus of the ſpiral line of the Ionic volute.

CIRCUS, in antiquity, a great building of a round or oval figure, erected by the ancients, to exhibit ſhews to the people.

The Roman circus was a large, oblong edifice, arched at one end, encompaſſed with porticoes, and furniſhed with two rows of ſeats, placed aſcending over each other. In the middle was a kind of foot bank, or eminence, with obeliſks, ſtatues, and poſts at each end This ſerved them for the courſes of their bigæ and quadrigæ.

Thoſe that have meaſured the circus ſay, that it was 2187 feet long, and 960 broad; ſo that it was the greateſt building in Rome: ſome ſay it would contain 150,000 people, others 260,000, or 300,000.

CIRRI, among botaniſts, fine ſtrings of thread like filaments, by which ſome plants faſten themſelves to walls, trees, &c. ſuch are thoſe of ivy.

CIRRI, in ichthyology, certain oblong and ſoft appendages, not unlike little worms, hanging from the under jaws or mouths of ſome fiſhes: theſe cirri, commonly tranſlated beards, afford marks to diſtinguiſh the different ſpecies of the fiſh, on which they are found.

CIRSOCELE, or HERNIA VARICOSA, in ſurgery, a preternatural diſtenſion or divarication of the ſpermatic veins in the proceſs of the peritonæum, immediately above the teſticle, and ſometimes higher up in the ſcrotum, or even in the groin, inſomuch that they reſemble the inteſtines of a bird, and equal the ſize of a gooſe quill, with varicoſe nodes, by which means the teſticle appears much bigger, and hangs down lower than it ſhould do.

The cauſe of this diſorder is thought to be in the blood, being either too redundant in quantity, or of too thick and gluey a conſiſtence; ſo that by ſtagnating in theſe veins in too great quantities, it cauſes them to be thus preternaturally diſtended. Frequently the diſorder alſo ariſes from ſome external violence, whereby the coats of the veſſels are contuſed, over-ſtretched, and weakened, and the blood by that means impeded in its courſe.

This diſorder ſeldom gives the patient much trouble or uneaſineſs; nor is there any neceſſity for the uſe of medicines, and much leſs any chirurgical operations, except when it becomes intolerable by violent pains.

If through pain, or other uneaſineſs, it becomes neceſſary to try ſome means, as in healthy conſtitutions this diſorder may ariſe from a redundancy of ſemen, in the ſpermatic veins, the moſt ready and effectual remedy will be matrimony; but if the caſe ſhould happen to be in a perſon already married, there is but little room to expect a cure from medicines: however, ſuch topical remedies may be applied as are known to attenuate the blood and ſtrengthen the relaxed parts. The patient ſhould alſo be blooded.

When other means have proved ineffectual, and the diſorder ſtill increaſes, the opening thoſe veſſels which are moſt diſtended, the whole length of the tumour, is much approved of; and after letting them diſcharge a few ounces of blood, to make the dreſſings with ſcraped lint, a vulnerary plaſter, compreſs, and proper bandage, and to treat the wound in the ſubſequent dreſſings with ſome vulnerary balſam.

CISALPINE, any thing on this ſide the Alps. Thus the Romans divided Gaul into ciſalpine and tranſalpine. It muſt be obſerved, however, that what was ciſalpine with regard to the Romans, is tranſalpine with regard to us.

CISLEU, in Hebrew chronology, the ninth month of their eccleſiaſtical, and the third of the civil year, anſwering nearly to our November.

CISSOID, in the higher geometry, an algebraic curve, firſt invented by Diocles, an ancient Greek geometrician, whence it is peculiarly called the Ciſſoid of Diocles: its chief uſe is for finding two mean proportionals between two given right lines; but Sir Iſaac Newton, in his *Enumeratio linearum tertii Ordinis*, reckons it amongſt one of the defective hyperbolas, being according to him the forty-ſecond ſpecies. In his *Appendix de Equationum Conſtructione Lineari*, at the end of his *Arithmetica Univerſalis*, he gives the following elegant deſcription of this curve.

Let A G be the diameter, and F the center of a circle to which the ciſſoid belongs (plate XXXVII. *fig.* 9.) At the point F let the perpendicular F D be erected, and produced in infinitum; and let F G be produced to P, that F P may be equal to the diameter of the circle: let the rectangular ruler P E D be moved, ſo that the leg E P may always paſs through the point P, and the other leg E D muſt be equal to the diameter A G, or F P, with its end D, always moving in the line F D; and the middle point C of this leg will deſcribe the ciſſoid G C K. To find the equation of this curve, draw C B perpendicular to F D, and let E C or C D $= a$, C B $= y$, F B $= x$, and on account of the ſimilar triangles D B C, D E H, it will be B D $(\sqrt{a^2-y^2})$: B C + C D $(y+a)$ :: E D $(2a)$: E H + H D (F H + H D) or F D. Wherefore $\frac{2ay+2aa}{\sqrt{a^2-y^2}}$ (= F D = F B + B D) $= x+\sqrt{a^2-y^2}$. Now by multiplying by $\sqrt{a^2-y^2}$, there is made $2ay+2aa = aa-yy+x\sqrt{a^2-y^2}$, or $2ay+aa+yy = x\sqrt{a^2-y^2}$, and by ſquaring the parts, divided by $\sqrt{a+y}$, and ordering them, there comes out $y^3+3ay^2+3a^2y+x^2y+a^3-ax^2=0$.

If between any two quantities a and b, there be two mean proportionals to be found: Take A M $= a$, raiſe the perpendicular M N $= b$, join A N and move the ruler P E D until its point C fall upon the right line A N; then let fall C S perpendicular to A P, take t to S R and v to S P, as M N is to S C, and becauſe A S, S R, S G, S C are continual proportionals, a, t, v, b, will alſo be continual proportionals.

CISTERCIANS, in church hiſtory, a religious order founded in the eleventh century by St. Robert, a benedictine. They became ſo powerful, that they governed almoſt all Europe, both in ſpirituals and temporals. Cardinal de Vitri deſcribing their obſervances, ſays, they never wore ſkins nor ſhirts, nor ever eat fleſh, except in ſickneſs; and abſtained from fiſh, eggs, milk, and cheeſe; they lay upon ſtraw-beds in their tunics and cowls: they roſe at midnight to prayers: they ſpent the day in labour, reading and prayer: and in all their exerciſes obſerved a continual ſilence. The habit of the Ciſtercian monks is a white robe, in the nature of a caſſock, with a black ſcapulary and hood, and is girt with a woollen girdle. The nuns wear a white tunic, and a black ſcapulary and girdle.

CISTERN denotes a ſubterraneous reſervoir of rain water;

dials ſerved in the ſummer. They had two great defects; the one, that the water ran out with a greater or leſs facility, as the air was more or leſs denſe; the other, that the water ran more readily at the beginning, than towards the concluſion.

M. Amontons has invented a clepſydra free from both theſe inconveniences, and which has theſe three grand advantages; of ſerving the ordinary purpoſe of clocks; of ſerving in navigation for the diſcovery of the longitude; and of meaſuring the motion of the arteries.

Conſtruction of a Clepsydra. To divide any cylindric veſſel into parts to be emptied in each diviſion of time; the time wherein the whole, and that wherein any part is to be evacuated, being given.

Suppoſe, v. gr. a cylindric veſſel, whoſe charge of water flows out in twelve hours, were required to be divided into parts to be evacuated each hour. 1. As the part of time 1, is to the whole time 12, ſo is the ſame time 12 to a fourth proportional, 144. 2. Divide the altitude of the veſſel into 144 equal parts: here the laſt will fall to the laſt hour; the three next above to the laſt part but one; the five next to the tenth hour, &c. Laſtly, the 23 laſt to the firſt hour.

For ſince the times increaſe in the ſeries of the natural numbers 1, 2, 3, 4, 5, &c. and the altitudes, if the numeration be in retrograde order from the twelfth hour, increaſe in the ſeries of the unequal numbers 1, 3, 5, 7, 9, &c. the altitude, computed from the twelfth hour, will be as the ſquares of the times 1, 4, 9, 16, 25, &c. therefore the ſquare of the whole time 144, comprehends all the parts of the altitude of the veſſel to be evacuated. But a third proportional to 1 and 12 is the ſquare of 12, and conſequently it is the number of equal parts into which the altitude is to be divided, to be diſtributed according to the ſeries of the unequal numbers, through the equal interval of hours. Since in lieu of parts of the ſame veſſel, other leſs veſſels equal thereto may be ſubſtituted; the altitude of a veſſel emptied in a given ſpace of time being given, the altitude of another veſſel to be emptied in a given time may be found; viz. by making the altitudes as the ſquares of the times. Hence we ſee the method of conſtructing the clepſydræ uſed by the ancients.

Theory of Clepsydræ. Let EBFC (plate XLI. *fig.* 1.) be a propoſed vaſe or open veſſel, in which, by immerſing a ſolid, as LDMC, whoſe form is to be determined, we are to render the deſcent of the water uniform.

Suppoſe now the ſpace EBFMDLC contained between the ſolid body and the clepſydra filled with water, and then evacuated through a ſmall hole made at the bottom of the axis LC; it is evident that the ſurface of the water muſt in its deſcent along the axis LC deſcribe equal ſpaces in equal times, according to the above hypotheſis: this premiſed, draw the ordinate GI perpendicular to LC, and gi parallel to, and indefinitely near, GI. Put $CG=x$, $GI=y$, $GH=z$, $Gg=\dot{x}$, & $\dot{t}$ for the indefinitely ſmall particle of time in which the ſurface of the effluent water deſcribes the diſtance Gg; then if the vaſe be flat, and conſequently of equal thickneſs throughout, $\overline{y-z}\times\dot{x}$ will be as the fluxion of the deſcending ſurface, otherwiſe the veſſel being round, $\overline{yy-zz}\times\dot{x}$ will be as the fluxion of the deſcending ſurface; and as in either of theſe caſes the velocity of the ſaid ſurface is as $\dot{t}\sqrt{x,}$ it follows that in the former $\overline{y-z}\times\dot{x}$ will be equal to $\dot{t}\sqrt{x,}$ and in the latter $\frac{y^2-z^2}{p}\times\dot{x}=\sqrt{px}\,\dot{t}$, wherein p repreſents a conſtant quantity to be aſſumed at pleaſure.

If $\dot{t}$ be conſidered as conſtant, $\dot{x}$ will be conſtant alſo, whence our expreſſions become, $y-z=\sqrt{px,}$ and $\frac{y^2-z^2}{p}=\sqrt{px,}$ reſpectively, and therefore the deſcending ſurface of the water will move with an equable celerity.

Example 1. Let the profil BIC of the clepſydra, cut by a plane paſſing through the axis LC, be the common parabola, we ſhall have $y=\sqrt{px,}$ by the property of that curve; therefore in the firſt caſe we have $y=y-z$, or $z=0$, conſequently in this circumſtance the ſolid LDMC muſt be omitted: but in the ſecond caſe we have $yy=px$, whence, by ſubſtituting px for yy in the general expreſſion, there will ariſe $z^2=px-p\sqrt{px,}$ whence $z=\sqrt{\overline{x-\sqrt{px}}\times p}$: from this equation the nature of the ſolid LDMC may be determined.

Example 2. If the profil BIC becomes a biquadratic parabola, whoſe equation is $y=\sqrt[4]{p^3x,}$ we ſhall in the firſt caſe have $z=\overline{p^3x}^{\frac{1}{4}}-px^{\frac{1}{2}}$, & $z=\sqrt{p\times\overline{px}^{\frac{1}{4}}-p\times\overline{px}^{\frac{1}{2}}}$ in the ſecond: in the latter of theſe $z=0$; conſequently, if a veſſel be deſcribed by the revolution of a curve BIC, whoſe equation is defined by $y=\sqrt[4]{px^{1},}$ and then filled with water, which afterwards runs out of a ſmall round hole in the bottom C, the ſurface of the water ſhall deſcend equal ſpaces in equal times.

Clepsydra is alſo uſed for an hour-glaſs of ſand, and likewiſe for a water-clock. See the articles Hour-Glass and Water-Clock.

CLERGY, *Clerus*, κλῆρος, a general name given to the body of eccleſiaſtics of the Chriſtian church, in contradiſtinction to the laity.

The diſtinction of Chriſtians into clergy and laity, was derived from the Jewiſh church, and adopted into the Chriſtian by the apoſtles themſelves: whenever any number of converts were made, as ſoon as they were capable of being formed into a congregation or church, a biſhop or preſbyter, with a deacon, were ordained to miniſter to them. Of the biſhops, prieſts, and deacons, the clergy originally conſiſted; but in the third century, many inferior orders were appointed, as ſubſervient to the office of deacon, ſuch as ſub-deacons, acoluthiſts, readers, &c.

The privileges and immunities which the clergy of the primitive Chriſtian church enjoyed, deſerve our notice. In the firſt place, when they travelled upon neceſſary occaſions, they were to be entertained by their brethren of the clergy, in all places, out of the public revenues of the church. When any biſhop or preſbyter came to a foreign church, they were to be complimented with the honorary privilege of performing divine offices, and conſecrating the euchariſt in the church. The great care the clergy had of the characters and reputations of thoſe of their order, appears from hence, that in all accuſations, eſpecially againſt biſhops, they required the teſtimony of two or three witneſſes of good character: nor was any heretic admitted as an evidence againſt a clergyman. With regard to the reſpect paid to the clergy by the civil government, it conſiſted chiefly in exempting them from ſome kind of obligations to which others were liable, and granting them certain privileges and immunities which others did not enjoy.

By the eccleſiaſtical laws, no clergyman was allowed to relinquiſh his ſtation without juſt grounds and leave: but in ſome caſes reſignation was allowed of, as in old age, ſickneſs, or other infirmities. The laws were no leſs ſevere againſt all wandering clergymen, or ſuch as having deſerted their own church, would fix in no other. There were laws which obliged the clergy to conſtant attendance upon their duty: others inhibited pluralities, or the officiating in two parochial churches, or following any ſecular employments. Another ſort of laws reſpected the outward behaviour of the clergy; ſuch inhibited them from correſponding or converſing too freely with Jews and Gentile philoſophers: and there were canons which reſtrained them from eating and drinking in taverns, or being preſent at the public theatres. It was alſo enacted, that no biſhops, preſbyters, or deacons, ſhould viſit widows and virgins alone, but in the company of ſome other of the clergy, or ſome grave Chriſtians. As to the faſhion of their apparel, it does not appear that, for ſeveral ages, there were any diſtinctions obſerved therein between them and the laity.

The clergy of the church of Rome are diſtinguiſhed into regular and ſecular: the regular clergy conſiſts of thoſe monks or religious, who have taken upon them holy orders of the prieſthood, in their reſpective monaſteries. The ſecular clergy are thoſe which are not of any religious order, and have the care and direction of pariſhes. The proteſtant clergy are all ſeculars.

Benefit of Clergy is an ancient privilege, whereby one in orders claimed to be delivered to his ordinary, to purge himſelf of felony: this purgation was to be by his own oath, affirming his innocency, and the oath of twelve purgators, as to their belief of it, before a jury of twelve clerks: if the clerk failed in his purgation, he was deprived of his character, whereby he became a mere layman; or he was to be kept in priſon till a pardon was obtained; but if he purged himſelf, he was ſet at liberty.

This was formerly admitted, even in caſes of murder; but the ancient courſe of the law is much altered upon this head. By the ſtatutes of 18 Eliz. cap. vii. clerks are no more committed to their ordinary to be purged; but every man, to whom the benefit of clergy is granted, though not in orders, is put to read at the bar, after he is found guilty and convicted of ſuch felony, and ſo burnt on the hand, and ſet free for the firſt time, if the ordinary or deputy ſtanding by do ſay, *legit ut clericus*, otherwiſe he ſhall ſuffer death.

CLERK, a word originally uſed to denote a learned man, or man of letters; whence the term became appropriated to churchmen, who were from thence called clerks or clergymen: the nobility and gentry being uſually bred up to the exerciſe of arms, and none left but the eccleſiaſtics to cultivate the ſciences.

Clerk is alſo applied to ſuch as by their courſe of life exerciſe their pens in any court or office, of which there are various kinds.

CLEROMANCY, *κληρομαντεια*, a ſort of divination performed by throwing lots, which were generally black and white beans, little clods of earth, or pebbles; alſo dice, or ſuch like things, diſtinguiſhed by certain characters. They caſt the lots into a veſſel, and having made ſupplication to the gods to direct them, drew them out, and according to the characters, conjectured what ſhould happen to them.

CLEW *of a Sail*, in naval affairs, the lower-corner; and hence

Clew-Garnets are the ſame to the main-ſail and fore-ſail, which the clew-lines are to all other ſquare ſails, and are hauled up when the ſail is to be furled or brailed. See Clew-Line.

Clew-Lines are ropes faſtened to the clews or lower-corners of the ſquare ſails: their uſes are to draw each clew up to the yard, for the more eaſily furling or reefing the ſails. *Shipwreck*, p. 46, 47, *in the notes*.

CLIENT, *Cliens*, among the Romans, a citizen who put himſelf under the protection of ſome great man, who in reſpect of that relation was called patron. This patron aſſiſted his client with his protection, intereſt, and goods; and the client gave his vote for his patron, when he ſought any office for himſelf or his friends. Clients owed reſpect to their patrons, as theſe owed them their protection.

The right of patronage was appointed by Romulus, to unite the rich and poor together in ſuch a manner, as that one might live without contempt, and the other without envy; but the condition of a client, in courſe of time, became little elſe but a moderate ſlavery.

Client is now uſed for a party in a law-ſuit, who has turned over his cauſe into the hands of a counſellor or ſollicitor.

CLINCH, or Clench, in naval affairs, that part of a cable, or other rope, which is faſtened to the anchor, is called the clinch, and the act of faſtening is called clinching.

A peculiar method of faſtening a rope to a poſt, &c. is alſo called clinching.

CLIMACTERIC, *Annus Climactericus*, among phyſicians and natural hiſtorians, a critical year in a perſon's life, in which he is ſuppoſed to ſtand in great danger of death.

According to ſome, every ſeventh year is a climacteric; but others allow only thoſe years produced by multiplying 7, by the odd number 3, 5, 7, and 9, to be climacterical. Theſe years, they ſay, bring with them ſome remarkable change with reſpect to health, life, or fortune; the grand climacteric is the ſixty-third year; but ſome, making two, add to this the eighty-firſt: the other remarkable climacterics are the ſeventh, twenty-firſt, thirty-fifth, forty-ninth, and fifty-ſixth. The credit of climacteric years can only be ſupported by the doctrine of numbers introduced by Pythagoras; though many eminent men, both among the ancients and moderns, appear to have had great faith in it.

CLIMATE, in geography, a ſpace upon the ſurface of the terreſtrial globe, contained between two parallels, and ſo far diſtant from each other, that the longeſt day in one differs half an hour from the longeſt day in the other parallel.

The difference of climates ariſes from the different inclination or obliquity of the ſphere: the ancients took the parallel wherein the length of the longeſt day is twelve hours and three quarters, for the beginning of the firſt climate: as to thoſe parts that are nearer to the equator than that parallel, they were not accounted to be in any climate, either becauſe they may, in a looſe and general ſenſe, be conſidered as being in a right ſphere, though ſtrictly ſpeaking, only the parts under the equator are ſo; or becauſe they were thought to be uninhabited by reaſon of the heat, and were beſides unknown. The ancients, conſidering the diverſity there is in the riſing and ſetting of the heavenly bodies, eſpecially the ſun, and, in conſequence thereof, the difference in the length of the days and nights in different places, divided as much of the earth as was known to them, into climates; and inſtead of the method now in uſe, of ſetting down the latitude of places in degrees, they contented themſelves with ſaying in what climate the place under conſideration was ſituated. According to them, therefore, what they judged the habitable part of the northern hemiſphere was divided into ſeven climates, to which the like number of ſouthern ones correſponded.

A parallel is ſaid to paſs through the middle of a climate, when the longeſt day in that parallel differs a quarter of an hour from the longeſt day in either of the extreme parallels that bound the climate: this parallel does not divide the climate into two equal parts, but the part neareſt to the equator is larger than the other, becauſe the farther we go from the equator, the leſs increaſe of latitude will be ſufficient to increaſe the length of the longeſt day a quarter of an hour.

Some of the moderns reckon the different climates by the increaſe of half an hour in the length of the longeſt day, beginning at the equator, and going on till they come to the polar circle towards the pole: they then count the climates by the increaſe of a whole natural day, in the length of the longeſt day, till they come to a parallel, under which the day is of the length of fifteen natural days, or half a month; from this parallel they proceed to reckon the climates by the increaſe of half or whole months, in the artificial day, till they come to the pole itſelf, under which the length of the day is ſix months. Thoſe between the equator and the polar circles are called hour climates; and thoſe between the polar circles and the poles, month climates.

Vulgarly the term climate is beſtowed on any country or region differing from one another, either in reſpect of the ſeaſons, the quality of the ſoil, or even the manners of the inhabitants, without any regard to the length of the longeſt day.

CLIMAX, or Gradation, in rhetoric, a figure wherein the word or expreſſion which ends the firſt member of a period begins the ſecond, and ſo on; ſo that every member will make a diſtinct ſentence, taking its riſe from the next foregoing, till the argument and period be beautifully finiſhed: or in the terms of the ſchools, it is when the word or expreſſion, which was predicate in the firſt member of a period, is ſubject to a ſecond, and ſo on, till the argument and period be brought to a noble concluſion; as in the following gradation of Dr. Tillotſon. “ After we have practiſed “ good actions a while, they become eaſy; and when “ they are eaſy, we begin to take pleaſure in them; “ and when they pleaſe us, we do them frequently; “ and by frequency of acts, a thing grows into a habit; “ and confirmed habit is a ſecond kind of nature, and “ ſo far as any thing is natural, ſo far it is neceſſary,

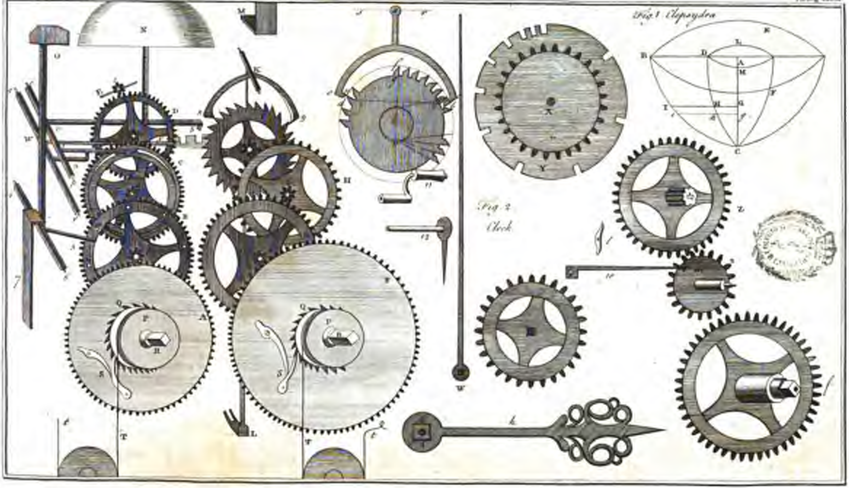


Fig. 1 Clepsydra

K
L
B
D
A
M
F
I
H
G
e
d
f
C

Fig. 2 Clock

N
M
O
E
D
W
K
g
H
Y
X
Z
A
Q
P
R
S
T
L
F
W
k
t

" and we can hardly do otherwiſe; nay, we do it many " times, when we do not think of it."

CLINIC, a term applied by the ancient church-hiſtorians, to thoſe who received baptiſm on their death bed.

Clinic, in a modern ſenſe, is ſeldom uſed but for a quack, or rather for an empirical nurſe, who pretends to have learned the art of curing diſeaſes by attending on the ſick.

Clinic Medicine, *Medicina Clinica*, was particularly uſed for the method of viſiting and treating ſick perſons in bed, for the more exact diſcovery of all the ſymptoms of their diſeaſe.

CLINOIDES, in anatomy, are four ſmall proceſſes in the inſide of the os ſphenoides, forming a cavity called ſella turcica, in the middle of that bone, in which lies the glandula pituitaria.

CLITORIS, or as ſome call it, *Mentula Muliebris*, in anatomy, a part of the external female pudenda, ſituated at the angle which the nymphæ form with each other.

Its common ſtate is to be almoſt entirely buried under the ſkin or prepuce. Its general ſize is that of the uvula, or ſcarce ſo much: its ſhape much reſembles the ſhape of that part, yet it ſometimes is found of an extraordinary bigneſs, as large as the penis: but even in this caſe, it has no urethra. It has a glans or apex as the penis has, but this is not perforated. It is uſually covered with a fœtid matter, like that of the glans of the penis. The prepuce covering the glans of the clitoris, is formed of the cutis of the pudendum, and furniſhed with nervous papillæ: hence it is of exquiſite ſenſibility to the touch. It has alſo a ligament, by which it is connected to the oſſa pubis, in the ſame manner as the penis is in men. Its uſe is to produce a titillation in the coitus, and to encreaſe the pleaſure.

CLOACA, in Roman antiquity, the common ſewer, by which the filth of the city of Rome was carried away.

Cloaca, in comparative anatomy, imports the canal in birds, through which the egg deſcends from the ovary in its exit.

CLOCK, a kind of movement, or machine, ſerving to meaſure and ſtrike time.

The uſual chronometers are watches and clocks: the former in ſtrictneſs are ſuch as ſhew the parts of time; the latter, ſuch as publiſh it by ſtriking: though the name watch is ordinarily appropriated to pocket clocks; and that of clocks to larger machines, whether they ſtrike or not.

The invention of clocks with wheels is referred to Pacificus, archdeacon of Verona, who lived in the time of Lotharius, ſon of Louis the Debonnair; on the credit of an epitaph quoted by Ughelli, and borrowed by him from Panvinius.

They were at firſt called nocturnal dials, to diſtinguiſh them from ſun-dials, which ſhewed the hour by the ſun's ſhadow. Others aſcribe the invention to Boethius, about the year 510.

Mr. Derham makes clock-work of a much older ſtanding; and ranks Archimedes's ſphere, mentioned by Claudian, and that of Poſidonius, mentioned by Cicero, among the machines of this kind; not that either their form or uſe were the ſame with thoſe of ours, but that they had their motion from ſome hidden weights or ſprings, with wheels, or pullies, or ſome ſuch clock-work principle.

But be this as it will, it is certain the art of making clocks, ſuch as are now in uſe, was either firſt invented, or at leaſt retrieved, in Germany about 200 years ago.

The water-clocks, or clepſydræ, and ſun-dials, have both a much better claim to antiquity. The French annals mention one of the former kind ſent by Aaron, king of Perſia, to Charlemaign, about the year 807, which ſeemed to bear ſome reſemblance to the modern clocks: it was of braſs, and ſhewed the hours by twelve little balls of the ſame metal, which fell at the end of each hour, and in falling, ſtruck a bell, and made it ſound. There were alſo figures of twelve cavaliers, which at the end of each hour came forth at certain apertures, or windows, in the ſide of the clock, and ſhut them again, &c.

Among the modern clocks, the moſt eminent for their furniture, and the variety of their motions and figures, are thoſe of Straſbourg and of Lyons. In the firſt, a cock claps his wings, and proclaims the hour; the angel opens a door, and ſalutes the virgin; and the Holy Spirit deſcends on her, &c. In the ſecond, two horſemen encounter, and beat the hour on each other; a door opens, and there appears on the theatre the virgin, with Jeſus Chriſt in her arms, the magi, with their retinue, marching in order, and preſenting their gifts; two trumpeters ſounding all the while to proclaim the proceſſion. See Scottus; ſee alſo Salmaſius on Solinus, Maſius *de Tintinnabulis*, and Kircher in his *Muſeum Romanum*, and *Oedip. Ægypt.*

The invention of pendulum clocks is owing to the happy induſtry of the laſt age: the honour of it is diſputed between Huygens and Galileo. The former, who has written a volume on the ſubject, declares it was firſt put in practice in the year 1657, and the deſcription thereof printed in 1658. Becher, *de Nova Temporis Dimetiendi Theoria, anno* 1680, ſtickles for Galileo; and relates, tho' at ſecond-hand, the whole hiſtory of the invention; adding, that one Treſler, clock-maker to the father of the then grand-duke of Tuſcany, made the firſt pendulum-clock at Florence, by direction of Galileo Galilei; a pattern of which was brought into Holland.

The academy de'l Cimento ſay expreſsly, that the application of the pendulum to the movement of a clock was firſt propoſed by Galileo, and firſt put in practice by his ſon Vincenzo Galilei, in 1649.

Be the inventor who he will, it is certain the invention never flouriſhed till it came into Huygens's hands, who inſiſts on it, that if ever Galileo thought of ſuch a thing, he never brought it to any degree of perfection.

The firſt pendulum-clock made in England, was in the year 1622, by Mr. Fromantil, a Dutchman.

Principles and Calculation of Clock-Work.

The work contained between the braſs-plates of a clock A E K F (plate XLI. *fig.* 2.) is as follows: F the firſt or great wheel of 96 teeth; G the ſecond wheel of 60 teeth, its pinion *g* of 8 leaves; H the third wheel of 56 teeth, its pinion *h* of 8 leaves; I the balance wheel of 30 teeth, its pinion *i* of 7 leaves; and K the balance. Likewiſe A the great wheel of 78 teeth; B the pin-wheel of 48 teeth, *b* its pinion of 8 leaves; C the hoop-wheel of 48 teeth, *c* its pinion of 6 leaves; D the warning-wheel of 48 teeth, and its pinion *d* of 6 leaves; E the fly, *e* its pinion of 6 leaves.

The ends R, R, of the arbors of the wheels A, F, come through the face of the clock, and theſe arbors are fixed in the barrels P, P, of 6 or 7 inches diameter; and on theſe barrels, the ſtrings T *t* are wound, which go round two pullies with the weights that carry the wheels about. Theſe two barrels are moveable round about within the wheels, but are kept from turning back by the catch S and its ſpring, and the racket-wheels Q fixed to the barrel. The weights are wound up by help of the winch or handle 11. In the rim of the wheel B are 8 pins, which, as the wheel goes round, thruſt back the end 5 of the hammer O, and when it goes off the pin, the ſpring 7 makes the hammer O ſtrike againſt the bell N.

The wheel C has a hoop upon its rim, which its cut away in one place, to let the end 2 of the detent fall in. In the rim of the wheel D, there is a pin which ſtops againſt the end *x* of the arm *w x*, and hinders the wheels turning about.

On the axis *o p* is fixed the two pieces *v s*, and the detent 12. On the axis *q r* is fixed two pieces *w x*, and the lifter 3; and on the end *r* of that axis which comes through the fore plate, is put the lifter 10, and pinned faſt on.

The arbor of the wheel G comes through the face: upon this arbor, between the face and fore plate, is put the wheel z of 20 teeth, its arbor being hollow; and under the wheel is put the braſs ſpring *l*, with the concave ſide upwards, this ſpring having a ſquare hole in it, to fit the ſhoulder of the arbor of G. The wheel Z of 40 teeth turns upon a fixed pin or axis, and is driven by the wheel z. The dial-wheel *f* of 48 teeth, is put with its hollow ſocket upon the arbor or ſocket of z; then the face being put on, their ends come through it, and the hour-hand *k* is put upon the ſquare end of *f*, and the minute-pointer W, upon the end of z, the wheel z being thruſt down to bend the ſpring, and then a pin put in to keep it there; the pinion of z, called the pinion of report, has 8 teeth, and drives the wheel *f* and the hour-hand. Now the ſpring *s* keeps the wheel z pretty tight upon the axis of G, ſo that G will carry it about along with it; and if the minute-pointer be thruſt about, it will force about the wheel z, and alſo Z, and likewiſe *f* with the hour-pointer.

The arbor of the wheel A goes through the back plate; upon it, behind the plate, is put the wheel V (or pinion of report) of 28 teeth, and pinned there. The double wheel X Y is carried by V, and turns upon a pin fixed on the back of the plate. The wheel X has alſo 28 teeth, and the count-wheel Y is divided into 11 parts of unequal lengths; according to the ſtrokes the clock is to ſtrike at every hour, the part of this wheel is repreſented at *s*. A ſlender ſpring is put on with this wheel to keep it tight. This part may be made more ſimple, by leaving out the wheels V, X, and putting Y upon the axis of A inſtead of V, but it muſt be put on the contrary way.

The arbor of the balance-wheel I, comes through the fore plate, almoſt to the face, and through a hole in the face is put the hollow ſocket of the ſecond pointer 12; and this ſhews the ſeconds by a ſmall circle divided into 60 parts: and the face is alſo divided into two circles, ſhewing hours and minutes.

The pendulum hangs on the fixed piece of braſs M, by a button at top, and a thin piece of braſs going into a ſlit at M; and a flat piece of braſs goes into the fork L, ſo that if the pendulum moves, it muſt move the rod K E, and balance K along with it.

The pallats 8, 9, of the balance K, are ſo formed, that the under-ſide of 8, and the upper-ſide of 9, where the teeth of the wheel I act, are poliſhed planes, and made ſloping; ſo that a tooth ſliding along the under-ſide of the pallat 8, will force the balance K to the left hand, and a tooth ſliding along the upper-ſide of the pallat 9, will force it to the right.

The work is put together, by ſetting the teeth together that are marked in the wheel B, and in the pinion *c*, and likewiſe in the wheel C, and pinion *d*. Then the minute-hand or pointer is put on the arbor of z, mark to mark; and the hour-pointer the ſame way on the arbor of *f*; and the wheels z, Z, *f*, are ſet to one another according to their marks.

The weights hanging upon the wheels A, F, and the pendulum made to vibrate, the wheel F drives G, which drives H, which dives I; then whilſt the pendulum vibrates to the right, a tooth ſlips off the pallat 9, and in its return to the left a tooth ſlips off the pallat 8; then on the right another goes off 9, and ſo on alternately; and the weight cauſing the teeth to act againſt the pallats of the balance, keeps the pendulum in motion, and the wheel I goes round once in a minute.

As the wheel G goes round, it carries about z, with the minute-pointer, once round in an hour, z drives Z, which drives *f* once round in 12 hours. Whilſt the wheel z goes round, the pin *m* raiſes the lifter 10, which lifts up the piece 3, and the arm *w x*; the piece 3 raiſes the detent 12, together with *v s*; the end 2 of the detent being raiſed above the hoop, the wheel C moves about, and by the oblique figure of the end of the detent 2, it raiſes the end of the detent higher, and alſo raiſes *s* out of the notch of the count-wheel. Then the wheel D turns round, till the pin in the rim ſtops at the end *x*, which hinders the motion. But as the wheel z goes further about, the lifter 10 falls down off the pin, together with the piece *w x*, and latch 3, which ſuffers the wheel D, and the reſt to turn round, and the pin which cauſes the hammer to ſtrike ſo often, till the end *s* falls into a notch of the count-wheel; and then the detent 2 falls into the vacancy in the hoop, and locks the work; which continues ſo till the next hour, that the piece 10 is raiſed again, and the clock ſtrikes as before: the wheel C goes round every ſtroke of the clock; but it ſtrikes one more every ſucceeding hour, becauſe the teeth between the notches are made longer and longer in the count-wheel, and it turns round once in 12 hours.

In the ſtriking part of the clock, the pin-wheel being divided by the pinion of the hoop-wheel, the quotient ſhews the number of pins in the pin-wheel. If 78 be divided by the number of pins, the quotient ſhews the revolutions that the pin-wheel makes for one revolution of the count-wheel.

The hoop-wheel, divided by the pinion of the warning-wheel, muſt be a whole number.

In the motion part, the train is the number of beats the clock makes in an hour, which is 3600 for ſeconds: in this caſe the balance-wheel muſt have 30 teeth.

If G turns round once in an hour and ſhews minutes, then the quotient of G divided by the pinion of H, multiplied by the quotient of H, divided by the pinion of I, and that multiplied by twice the teeth in I, muſt be equal to the train. And if the clock beats ſeconds, then the product of the two quotients muſt be 60.

If G ſhews the hours, then the quotient of *f* divided by the pinion of Z, multiplied by the quotient of Z divided by z, muſt be 12.

From the great wheel to the balance, the wheels drive the pinions; but to the dial-wheel, the pinions drive the wheels: the former increaſes the motion, the latter leſſens it.

Any wheel being divided by the pinion that works in it, ſhews how many turns that pinion hath to one turn of the wheel: as if the pinion be 5, and the wheel 60, it is ſet down thus,

5) 60 (12 times. Or thus $\frac{60}{5} = 12$ times.

The teeth of ſeveral wheels and pinions that work in one another, are ſet down thus:

4) 36 (9 times
8) 80 (10 times
6) 54 (9 times
5) 40 (8 times

$$\text{Or thus } \frac{36}{4} \times \frac{80}{8} \times \frac{54}{6} \times \frac{40}{5}$$

In the former way, the number on the left hand of any wheel is the pinion that it drives; and the number over it is the pinion on the ſame axis. In the latter way, the ſeveral fractional quantities repreſent the quotients.

Any wheel and the pinion it drives, will have the ſame motion with another wheel and pinion, when their quotients are equal. Thus a wheel of 36 drives a pinion of 4, juſt the ſame as a wheel of 45 does a pinion of 5; or a wheel of 90 a pinion of 10. In any motion we may uſe one wheel and one pinion, or elſe ſeveral wheels and ſeveral pinions, provided they all give the ſame motion: therefore, when a number is too big to be cut in one wheel, it may be divided into two or more quotients.

In a wheel and pinion that work in one another, their diameters muſt be as the number of teeth in each: and the diameter muſt be meaſured, not to the extremity, but to the middle of the tooth, or where they act.

The excellency of clock-work conſiſts in forming the teeth truly, and to fit the notches exactly without ſhaking, and to play freely.

The pallats 8, 9, are here formed by the common method; a better way of forming them is thus: From the center of motion *a* deſcribe two ſmall arches *b c* and *d e*; theſe ſmall lines or planes *b c* and *d e*, and alſo the working ſide of the tooth *f g*, muſt all range to *h*, the center of the balance-wheel. And the ends of the pallats *b y*, and *d e*, muſt range a little to the right hand of the center *a*; then the teeth of the balance-wheel will fall alternately on the ſides *b c*, and *d e*; and any tooth, whilſt it acts againſt *b c*, or *d e*, will have no effect in moving the pendulum; but remains without motion till it makes its eſcape off the angle *b*, or *d*; and then in moving along the plane *b y*, or *d n*, it forces the pendulum to the right or left.

But the conſtruction may be improved thus: Take *a s*, *a r*, each equal to $\frac{1}{3}$ *b d*. From the center *s*, deſcribe the arches *b c*, *d e*, and let the ends *b y*, *d n*, range to *r*. Or it will be the ſame thing to deſcribe *b c*, and *d e*, from the center *a*; and let the acting ſide of the tooth range to *v*, the out-ſide of the circle deſcribed with the radius *v h* = $\frac{1}{3}$ *f b*.

water; or a veſſel ſerving as a receptacle for rain or other water for the neceſſary uſes of a family.

If a ciſtern is to be made in a cellar to preſerve water for culinary uſes, the brick or ſtone ſhould be laid with terras, or cemented with a compoſition of ſlacked ſifted lime and linſeed oil, tempered together with tow or cotton-wool. In this caſe the bottom ſhould be covered with ſand to ſweeten and preſerve it.

In making ciſterns, the walls ſhould be good and built to advantage, for fear the water ſhould be loſt; and the inſide ſhould be well cemented, eſpecially in the angles.

CISTUS, in botany, a genus of plants, the flower of which conſiſts of five roundiſh, plain, patent, very large petals; the fruit is a roundiſh capſule, containing numerous ſmall roundiſh ſeeds. This plant is of an inebriating quality; for which reaſon, in many places of Saxony, they boil it in their beer. They lay it alſo among clothes, to expel moths.

***Dwarf*-CISTUS**, in botany, the ſame with the helianthemum, or ſmall ſun-flower.

CITADEL, a place fortified with four, five, or ſix baſtions, built on a convenient ground near a city, that it may command it in caſe of a rebellion. The city therefore is not fortified on the part oppoſite to the citadel, though the citadel is againſt the city. The beſt form for a citadel is a pentagon, a ſquare being too weak, and a hexagon too big.

CITATION, in eccleſiaſtical courts, is the ſame with ſummons in civil courts.

A perſon is not to be cited out of the dioceſe where he lives, unleſs it be by the archbiſhop in default of the ordinary, or where the ordinary is party to the ſuit, and in caſes of appeal.

CITHARA, in antiquity, a muſical inſtrument, the preciſe ſtructure of which is not known; ſome think it reſembled the Greek delta Δ; and others, the ſhape of a half moon. At firſt it had only three ſtrings, but the number was at different times increaſed to eight, to nine, and laſtly to twenty-four. It was uſed in entertainments and private houſes, and played upon with a plectrum or quill, like the lyre. See the article LYRE.

CITIZEN, *Civis*, a native or inhabitant of a city, veſted with the freedom and liberties of it.

CITREUM, or CITRUS, the citron-tree, in botany. See the article CITRUS.

CITRINUS, in natural hiſtory, a kind of ſprig cryſtal, of a fine yellow colour, which being ſet in rings, is often miſtaken for a topaz.

CITRON-TREE, *Citrus*, in botany. See the article CITRUS.

The fruit of this tree has much the ſame qualities with the lemon, from which it is diſtinguiſhed by its firmneſs, greater bulk, briſker ſmell, and higher colour. We have eſſences, oils, confections, and waters obtained from it.

CITRUL, *Citrullus*, makes a diſtinct genus of plants, according to ſome, otherwiſe called anguria; but Linnæus comprehends it among the cucumbers: it is ſaid to have the ſame medicinal qualities with the cucurbita or gourd.

CITRUS, the citron-tree, in botany, a genus of plants, the flower of which conſiſts of five oblong, plain, patent petals. The fruit is a berry with a fleſhy rind, a pulp conſiſting of veſicles, and with nine cells, containing two ſubovated callous ſeeds in each cell.

CITY, *Civitas*, or *Urbs*, a large populous town, capital of ſome country, province, or diſtrict, and the ſee of a biſhop.

Town and city are frequently uſed in a ſynonymous ſenſe; however, cuſtom ſeems to have appropriated the term city to ſuch towns as are, or formerly were, the ſees of a biſhop: hence it is, that Edinburgh, Glaſgow, &c. are ſtill called cities, though they are no longer the ſees of biſhops, ſince the eſtabliſhment of preſbytery in Scotland.

CIVES, the Engliſh name of a ſpecies of onion, growing in tufts, and ſeldom exceeding ſix inches in height: they never produce any bulbs, and are much uſed in ſallads in ſpring.

CIVET, a ſoft unctuous odoriferous ſubſtance, about the conſiſtence of honey or butter; of a whitiſh, yellowiſh, or browniſh colour, and ſometimes blackiſh, brought from the Brazils, the coaſt of Guinea, and the Eaſt-Indies; found in certain bags ſituated in the lower part of the belly of an animal of the cat kind. The bag has an aperture externally, by which the civet is ſhed or extracted. See ZIBETHICUM.

This ſubſtance has a very fragrant ſmell, ſo ſtrong as, when undiluted, to be diſagreeable; and an unctuous ſubacrid taſte. It is uſed chiefly in perfumes, rarely or never for medicinal purpoſes, though the ſingular effects which muſk has been lately found to produce may ſerve as an inducement to the trial. It unites with oils, both expreſſed and diſtilled, and with animal fats: in watery or ſpirituous liquors it does not diſſolve, but both menſtrua may be ſtrongly impregnated with its odoriferous matter, water by diſtillation, and rectified ſpirit by digeſtion: by trituration with mucilages, it becomes ſoluble in water.

CIVET-CAT. See ZIBETHICUM.

CIVIC CROWN, *Corona Civica*, was a crown given by the ancient Romans to any ſoldier who had ſaved the life of a citizen in any engagement.

This was accounted more honourable than any other crown, though compoſed of no better materials than oaken boughs.

It was a particular honour conferred upon any that merited this crown, that when they came to any of the public ſhews, the whole company, as well ſenate as people, ſhould ſignify their reſpect, by riſing up, as ſoon as they ſaw them enter, and that they ſhould take their ſeats upon theſe occaſions among the ſenators; being alſo excuſed from all troubleſome duties and ſervices in their own perſons, and procuring the ſame immunities for their father and grandfather.

CIVIL, *Civilis*, in a general ſenſe, ſomething that regards the policy, public good, or peace of the citizens, or ſubjects of the ſtate; in which ſenſe we ſay, civil government, civil law, civil right, civil war, &c.

CIVIL, in a legal ſenſe, is alſo applied to the ordinary procedure in an action, relating to ſome pecuniary matter or intereſt, in which ſenſe it is oppoſed to criminal.

CIVIL-LAW is properly the peculiar law of each ſtate, country, or city: but what we uſually mean by the civil law, is a body of laws compoſed out of the beſt Roman and Grecian laws, compiled from the laws of nature and nations, and, for the moſt part, received and obſerved throughout all the Roman dominions for above 1200 years.

The Romans took the firſt grounds of this law from the twelve tables, which were abridgments of the laws of Solon, at Athens, and of other celebrated cities of Greece; to which they added their own ancient cuſtoms of the city of Rome: theſe written laws were ſubject to various interpretations, whence controverſies ariſing, they were determined by the judgment of the learned; and theſe determinations were what they firſt called *jus civile*, after their ſeveral caſes were compoſed; which, leſt the people ſhould make them at pleaſure, were fixed certain and ſolemn; and this part of their law they called *actiones juris*, caſes at law. The Romans had alſo their *plebiſcita*, which were laws made by the commons, without the authority of the ſenate. The *jus honorarium*, which was an edict of ſome particular magiſtrate; the *ſenatus conſultum*, an ordinance made by the ſole authority of the ſenate; and the *principalis conſtitutio*, which was enacted by the prince or emperor. Theſe laws grew by degrees to a vaſt number of volumes, and therefore the emperor Juſtinian commanded his chancellor Tribonianus, with the aſſiſtance of ſome other eminent lawyers, to reduce it to a perfect body.

The body of the civil law is divided into three volumes, which are ſtill remaining, viz. the Pandects or Digeſts, the Code, and the Inſtitutes: to theſe were afterwards added the Authentics or Conſtitutions of Juſtinian, called alſo *Novellæ*, or Novels.

The civil law is not received at this day in any one nation, without ſome addition or alteration: for ſometimes the feudal law is mixed with it, or general or particular cuſtoms; and often ordinances and ſtatutes cut off a great part of it. In Turkey, the Juſtinian Greek code is only uſed. In Italy, the canon law and cuſtoms have excluded a good part of it. In Venice, cuſtom hath almoſt an abſolute government. In the Milaneſe, the feudal law and particular cuſtoms bear ſway. In Naples and Sicily, the conſtitutions and laws of the Lombards are ſaid to prevail. In Germany and Holland, the civil law is eſteemed to be the municipal law; but yet many parts of it are there grown obſolete, and others are altered, either by the canon law, or a different uſage. In Friezland it is obſerved with more ſtrictneſs; but in the northern parts of Germany, the *jus Saxonicum*, *Lubecenſe*, or *Culmenſe*, is preferred to it. In Denmark and Sweden, it hath ſcarce any authority at all. In France, only a part of it is received, and that part is in ſome places as a cuſtomary law; and in thoſe provinces neareſt to Italy, the municipal written law. In criminal caſes, the civil law is more regarded in France: but the manner of trial is regulated by ordinances and edicts. The civil law in Spain and Portugal is corrected by the *jus regium* and cuſtom. In Scotland, the ſtatutes of the Sederunt, part of the *Regiæ Majeſtatis*, and their cuſtoms, controul the civil law. In England it is uſed in the eccleſiaſtical courts, in the courts of the admiralty, and in the two univerſities; yet in all theſe it is reſtrained and directed by the common law.

Civil War, a war between people of the ſame ſtate, or the citizens of the ſame city.

Civil Year is the legal year, or annual account of time, which every government appoints to be uſed within its own dominions, and is ſo called in contradiſtinction to the natural year, which is meaſured exactly by the revolution of the heavenly bodies.

CIVILIAN, in general, denotes ſomething belonging to the civil law; but more eſpecially the doctors and profeſſors thereof are called civilians: of theſe we have a college or ſociety in London, known by the name of Doctors-commons.

CLACK, among countrymen. To clack wool, is to cut off the ſheep's mark, which makes the weight leſs, and yields leſs cuſtom to the king.

CLAIM, in law, a challenge of intereſt in any thing that is in poſſeſſion of another, as claim by charter, deſcent, acquiſition, &c.

Claim is either verbal or by action, and is ſometimes for lands, ſometimes for goods and chattels. It may be made by the party himſelf, and likewiſe by his ſervant or deputy, but not by a mere ſtranger in his name.

By the common law, claim is to be within a year and a day after the perſon is diſſeized of land.

Claim *of Liberty* is a ſuit to the king in the court of Exchequer, to have liberties confirmed there by the attorney-general.

Falſe **Claim** is a term uſed in the foreſt-laws, where a perſon claims more than his due, for which he is liable to be amerced.

CLAIR-OBSCURE, Chiaro-Scuro, or **Claro-Obscuro**. See the article Claro-Obscuro.

CLAMEA Admittenda, In Itinere Per Attornatum is a writ by which the juſtices in eyre are commanded to admit a perſon's claim by attorney, when he is employed in the king's ſervice and cannot perſonally appear.

CLAMP, among brickmakers, implies a pile of unburnt bricks built up for burning. Theſe clamps are built much after the ſame manner as arches are built in kilns, viz. with a vacuity betwixt each brick's breadth for the fire to aſcend by; but with this difference, that inſtead of arching, they truſs over, or over-ſpan, that is, the end of one brick is laid about half way over the end of another, and ſo till both ſides meet within half a brick's length, and then a binding brick at the top finiſhes the arch.

Clamps, in naval architecture, thick planks in a ſhip's ſide, which ſupport the ends of the beams. See Beams.

Clamps are alſo ſmall crooked plates of iron, forelocked upon the trunnions of the cannon, to keep them ſteady in their carriages at ſea.

Clamps are likewiſe frequently uſed to faſten the maſts or bowſprits of ſmall veſſels and boats.

Clamp Nails, ſuch nails as are uſed to faſten on clamps in the building or repairing of ſhips.

CLAMPING, in joinery, is the fitting a piece of board with the grain, to another piece of board croſs the grain. Thus the ends of tables are commonly clamped to prevent their warping.

CLAP, in medicine, the firſt ſtage of the venereal diſeaſe, more uſually called a gonorrhœa. See Gonorrhoea.

Clap-Board, among coopers, denotes any kind of board proper for making caſks or other veſſels of.

CLAR, or **Claer**, among metallurgiſts, denotes the powder of bone-aſhes, kept for covering the inſides of coppels.

CLARENCIEUX, the ſecond king at arms, ſo called from the duke of Clarence, to whom he firſt belonged; for Lionel, third ſon to Edward III. having by his wife the honour of Clare, in the county of Thomond, was afterwards declared duke of Clarence; which dukedom afterwards eſcheating to Edward IV. he made this earl a king at arms. His office is to marſhal and diſpoſe of the funerals of all the lower nobility, as baronets, knights, eſquires, on the ſouth-ſide of the Trent; whence he is ſometimes called Surroy, or South-roy, in contradiſtinction to Norroy.

CLARENDON. The conſtitutions of Clarendon are certain eccleſiaſtical laws drawn up at Clarendon, near Saliſbury. They were ſixteen in number, all tending to reſtrain the power of the clergy, and readily aſſented to by all the biſhops and barons, the archbiſhop Becket excepted, who oppoſed them at firſt, but was afterwards prevailed upon to ſign them. The pope Alexander III. declared againſt and annulled moſt of them

CLARET, a name given by the French to ſuch of their red wines as are not of a deep or high colour. See Wine.

Claret-Wine-Apple, is fair, and yields plenty of a pleaſant ſharp juice, from whence it has its name, and not from the colour, it being a white apple, but makes a vinous liquor, which, if well ordered, excels moſt other cyders, eſpecially with a mixture of ſweet apples.

CLARICHORD, or **Manichord**, a muſical inſtrument in form of a ſpinnet.

It has forty-nine or fifty ſtops, and ſeventy ſtrings, which bear on five bridges, the firſt whereof is the higheſt, the reſt diminiſhing in proportion. Some of the ſtrings are in uniſon, their number being greater than that of the ſtops. There are ſeveral little mortiſes for paſſing the jacks, armed with braſs-hooks, which ſtop and raiſe the chords inſtead of the feather uſed in virginals and ſpinnets: but what diſtinguiſhes it moſt is, that the chords are covered with pieces of cloth, which render the ſound ſweeter, and deaden it ſo, that it cannot be heard at any conſiderable diſtance; whence it comes to be particularly in uſe among the nuns, who learn to play, and are unwilling to diſturb the ſilence of the dormitory.

CLARIFICATION, in chemiſtry. See the article Depuration.

CLARINO, a trumpet: hence, *a doi clarini*, ſignifies that a piece of muſic is to be played by two trumpets. See the articles Trumpet, Cornet, &c.

CLARION, a kind of trumpet, whoſe tube is narrower, and its tone acuter and ſhriller than that of the common trumpet. It is ſaid that the clarion, now uſed among the Moors and Portugueſe, who borrowed it from the Moors, ſerved anciently for a treble to ſeveral trumpets, which ſounded tenor and baſs.

Clarion, in heraldry. He bears ruby, three clarions topaz, being the arms of the earl of Bath, by the name of Granville. Guillim is of opinion, that theſe three clarions are a kind of old-faſhioned trumpets; but others ſay, that they rather reſemble the rudder of a ſhip; others a reſt for a lance.

CLARK-GOOSE, in ornithology, a kind of wild gooſe, found in Zetland.

CLARO-OBSCURO, or **Clair-Obscure**, in painting, the art of diſtributing to advantage the lights and ſhadows of a piece, both with regard to the eaſing of the eye, and the effect of the whole piece.

Thus, when a painter gives his figure a ſtrong relievo, looſens them from the ground, and ſets them free from each other, by the management of lights and ſhadows, he is ſaid to underſtand the claro-obſcuro, which makes one of the great diviſions or branches of painting, the whole of a picture being reſolvable into light and ſhadow.

The doctrine of the claro-obſcuro will come under the following rules. Light may be either conſidered with regard to itſelf, or to its effects; the place wherein it is diffuſed, or its uſe.

For the firſt, light is either natural, or artificial. 1. Natural either comes immediately from the ſun, which is briſk, and its colour various, according to the time of the day; or it is that of a clear air, through which the light is ſpread, and whoſe colour is a little bluiſh; or a cloudy air, which is darker, yet repreſents the objects in their genuine colours, with more eaſe to the eye. 2. Artificial light proceeds from fire or flame, and tinges the object with its own colour; but the light it projects is very narrow and confined.

For the ſecond, the effects of light are either principal, as when the rays fall perpendicularly on the top of a body, without any interruption, or glancing, as when it ſlides along bodies; or ſecondary, which is for things at a diſtance.

3. For the place, it is either the open campaign, which makes objects appear with greater ſoftneſs; or it is in an incloſed place, where the brightneſs is more vivid, its determination more haſty, and its extremes more abrupt.

4. For the uſe or application, the light of the ſun is always ſuppoſed to be without, and over-againſt the picture, that it may heighten the foremoſt figures, the luminaries themſelves never appearing, in regard the light colours cannot expreſs them. The chief light, to meet on the chief group, and as much as poſſible, on the chief figure of the ſubject. The light to be purſued over the great parts, without being croſſed or interrupted with little ſhadows. The full force of the principal light to be only in one part of the piece, taking care never to make two contrary lights. Not to be ſcrupulouſly confined to one univerſal light, but to ſuppoſe other acceſſory ones, as the opening of clouds, &c. to looſen ſome things, and produce other agreeable effects. Laſtly, the light to be different, according to the quality of things whence it proceeds, and the nature of the ſubjects which receive it.

As for ſhadows, they are diſtinguiſhed, 1. Into thoſe formed on the bodies themſelves by their proper relievos. 2. Thoſe made by adjacent bodies; thoſe that make the parts of any whole, and the different effects, according to the difference of places.

For the firſt, ſince the different effects of light only appear by ſhadows, their degrees muſt be well managed. The place which admits no light, and where the colours are loſt, muſt be darker than any part that has relievo, and diſpoſed in the front.

Deepenings, which admit not of any light, or reflex of light, muſt never meet on the relievo of any member of any great elevated part, but in the cavities, or joints of bodies, the folds of draperies, &c. and to find occaſion for introducing great ſhadows, to ſerve for the repoſe of the ſight, and the looſening of things, inſtead of many ſhadows, which have a pitiful effect.

For the ſecond, the ſhadows made by bodies are either in plain and ſmooth places, or on the earth, wherein they are deeper than the bodies that occaſion them, as receiving leſs reflex light, yet ſtill diminiſh as they depart farther from their cauſe, or on the neighbouring bodies, where they are to follow the form of the ſame bodies, according to its magnitude, and its poſition in reſpect of the light.

For the third, in ſhadows that have parts, the painter muſt obſerve to take for a light in a ſhadowed place, the teint or luſtre of the light part; and on the contrary, for the ſhadow in the lightened part, the teint or luſtre in the ſhadow.

For the fourth, the effects of ſhadows are different, as the place is either wide or ſpacious; as in thoſe coming immediately from the ſun, which are very ſenſible, and their extremes pretty abrupt; from the ſerene air, which are fainter and more ſweet; from the dark air, which appear more diffuſed, and almoſt imperceptible; and from an artificial light, which makes the ſhadows deep, and their edges abrupt.

Claro Obscuro, or Chiaro-Scuro, is alſo uſed to ſignify a deſign conſiſting only of two colours, moſt uſually black and white, but ſometimes black and yellow; or it is a deſign waſhed only with one colour, the ſhadows being of a duſky brown colour, and the lights heightened up with white.

The word is alſo applied to two prints of two colours, taken off at twice, whereof there are volumes in the cabinets of the curious in prints.

CLARY, in botany, the Engliſh name of the ſclarea of Tournefort, comprehended by Linnæus among the ſpecies of ſalvia, or ſage.

Wild Clary, the ſame with the horminum of Tournefort, likewiſe accounted by Linnæus a ſpecies of ſage.

CLASPERS, among gardeners, the ſame with what botaniſts call cirrri. See Cirri.

CLASS, *claſſis*, an appellation given to the moſt general ſubdiviſions of any thing: thus animal is ſubdivided into the claſſes quadrupeds, birds, fiſhes, &c. which are again ſubdivided into ſerieſes or orders; and theſe laſt into genera.

Class is alſo uſed in ſchools, in a ſynonymous ſenſe with form, for a number of boys all learning the ſame thing.

The diſtributing boys into claſſes, contributes not only to raiſe an emulation among them, but is of great advantage to the maſter; who, by this means, can teach double the number it would otherwiſe be poſſible for him to do.

CLASSIC, or Classical, an epithet chiefly applied to authors read in the claſſes at ſchools, and who are in great authority there.

This term ſeems to owe its origin to Tullius Servius, who, in order to make an eſtimate of every perſon's eſtate, divided the Roman people into ſix bands, which he called claſſes. The eſtate of the firſt claſs was not to be under two hundred pounds, and theſe by way of eminence were called *claſſici*, claſſics: hence authors of the firſt rank came to be called claſſics, all the reſt being ſaid to be *infra claſſem*: thus Ariſtotle is a claſſic author in philoſophy; Aquinas, in ſchool divinity, &c.

By claſſical learning may be underſtood, ſuch an intimacy with the beſt Greek and Latin writers, as not only enables the reader to ſee and admire the beauty of their ſeveral compoſitions, but to imitate their manner of writing, to tranſcribe their ſpirit and eloquence, and make their diction and their ſentiment his own.

CLAVELLATI CINERES, the ſame with potaſhes. See the article Pot-Ashes.

CLAVICLES, *claviculæ*, in anatomy, are two bones ſituated tranſverſely and a little obliquely oppoſite to each other, at the ſuperior and anterior part of the thorax, between the ſcapula and ſternum. Their figure is ſomewhat like that of the letter S: their ſubſtance is ſpongy and brittle; their body is a fixt point for the deltoide, maſtoide, pectoral, and ſome other muſcles; they are protuberant for the ſubclavian muſcle; and of their two extremities, the rounder is articulated with the ſternum and with the firſt rib, and the flatter is articulated with the acromion.

The uſes of the clavicles are, 1. To keep the arms from falling too forward upon the breaſt, and to facilitate ſeveral of the motions of the arm. 2. To ſerve for the place of origin for ſeveral muſcles. 3. To defend the great ſubclavian veſſels which run under them.

CLAVIS properly ſignifies a key, and is ſometimes uſed in Engliſh to denote an explanation of ſome obſcure paſſages in any book or writing.

CLAVUS, in antiquity, an ornament upon the robes of the Roman ſenators and knights, which was more or leſs broad, according to the dignity of the perſon: hence the diſtinction of tunica anguſticlavia and laticlavia.

Clavus, in medicine and ſurgery, is uſed in ſeveral ſignifications: 1. Clavus hyſtericus is a ſhooting pain in the head, between the pericranium and cranium, which affects ſuch as have the green-ſickneſs. 2. Clavus oculorum, according to Celſus, is a callous tubercle on the white of the eye, taking its denomination from its figure. 3. Clavus imports indurated tubercles of the uterus. 4. Clavus imports a chirurgical inſtrument of gold, mentioned by Amatus Luſitanus, deſigned to be introduced into an exulcerated palate, for the better articulation of the voice. 5. Clavus is a callus or corn on the foot: this ariſes from a too great compreſſion of the cutis, which by this means hardens and forms itſelf into a knot. The cure is by ſoftening them, and then pulling them out. The pulp of a lemon laid to a corn, and bound on all night, often ſoftens it ſo by the morning, that it may eaſily be taken off.

CLAW, among zoologiſts, denotes the ſharp-pointed nails with which the feet of certain quadrupeds and birds are furniſhed.

CLAY, *Argilla*, in natural hiſtory, a genus of earths, the characters of which are theſe: they are firmly coherent, weighty, and compact; ſtiff, viſcid, and ductile to a great degree, while moiſt; ſmooth to the touch, not eaſily breaking between the fingers, nor readily diffuſible in water, and when mixed, not readily ſubſiding from it.

Of this genus authors enumerate a great many ſpecies, ſome white, ſome brown, grey, blue, yellow, green, red, black, &c. many of which having been diſtinguiſhed by particular names, will be mentioned, and their peculiar qualities explained, as they occur.

Beſides the uſe of clay for making potter's ware, it is a conſiderable improver of light and ſandy grounds, which, unleſs they be clayed, will bear nothing but rye, with whatever other compoſts they be manured; but once clayed, they will produce oats, barley, peaſe, &c. In Yorkſhire, they lay an hundred load upon an acre of ground, which will keep the ſoil in heart upwards of forty years: indeed, the firſt year after being clayed, it bears rank, ill-coloured, and broad-grained barley; but afterwards a plump round corn, like wheat.

Clay-Lands, thoſe abounding with clay, whether black, blue, yellow, white, &c. of which the black and the yellow are the beſt for corn.

All clay-ſoils are apt to chill the plants growing on them in moiſt ſeaſons, as they retain too much water: in dry ſeaſons, on the contrary, they turn hard and choke the plants. Their natural produce is weeds, gooſe-graſs, large daiſies, thiſtles, docks, poppies, &c. Some clay-ſoils will bear clover and rye-graſs; and, if well manured, will produce the beſt grain: they hold manure the beſt of all lands, and the moſt proper for them are horſe-dung, pigeon's dung, ſome kinds of marle, folding of ſheep, malt-duſt, aſhes, chalk, lime, ſoot, &c.

CLEATS, in naval affairs, pieces of wood having one or two projecting ends whereby to faſten the ropes: ſome of them are faſtened to the ſhrouds below for this purpoſe, and others nailed to different places of the ſhip's deck or ſides.

CLEAVERS, *aparine*, in botany, &c. See the article Aparine.

CLECHE, in heraldry, a kind of croſs, charged with another croſs of the ſame figure, but of the colour of the field.

CLEDGE, among miners, denotes the upper ſtratum of fuller's earth.

CLEF, or Cliff, in muſic, a mark ſet at the beginning of the lines of a ſong, which ſhews the tone or key in which the piece is to begin; or it is a letter marked on any line which explains the reſt. It is called clef, or key, becauſe hereby we know the names of all the other lines, and conſequently the quantity of every degree or interval: but becauſe every note in the octave is alſo called a key, this letter marked is, for diſtinction ſake, denominated the ſigned clef; and by this key is meant the principal note of a ſong, in which the melody cloſes.

There are three ſigned clefs, *c*, *f*, *g*; the clef of the higheſt part in a ſong, called treble, or alt, is *g* on the ſecond, ſometimes on the firſt, and ſometimes on the third line, counting upwards. The clef of the baſs, or loweſt part, is *f*, generally on the fourth line upwards, and often on the ſecond, third, and fifth: for all the other mean parts, the clef is *c*, ſometimes on one, and ſometimes on another line; indeed ſome that are really mean parts are frequently ſet with the clef *g*. See Treble, Tenor, and Bass.

It muſt be obſerved, however, that the ordinary ſignatures of the clefs bear little reſemblance to thoſe letters: for the figures, ſee Character *in Muſic*.

The clefs are always taken fifth to one another; that is, the clef *f* is the loweſt, *c* a fifth above it, and *g* a fifth above *c*.

When the clef is changed, it is with deſign to make the ſyſtem comprehend as many of the notes of the ſong as poſſible, and ſo to have the fewer above and below it. If then there be many lines above the clef, and few below it, this purpoſe is anſwered by placing the clef in the firſt or ſecond line; if there be many notes below the clef, it is placed higher in the ſyſtem. In effect, according to the relation of the other notes to the clef-note, the particular ſyſtem is taken differently in the ſcale, the clef-line making one in all the varieties. See Scale.

But ſtill, in whatever line of the particular ſyſtem the clef is found, it muſt be underſtood to belong to the ſame in the general ſyſtem, and to be the ſame individual note or found in the ſcale. By this conſtant relation of clef, we learn how to compare ſeveral particular ſyſtems of the ſeveral parts, and know how they communicate in the ſcale, which lines are uniſons, which are not; for it is not to be ſuppoſed that each part has certain particular bounds, within which another muſt never come. Some notes of the treble may come lower than ſome of the mean parts, or even of the baſs. To put together, therefore, into one ſyſtem, all the parts of a compoſition written ſeparately, the notes of each part muſt be placed at the ſame diſtance above and below the proper clef, as they ſtand in the ſeparate ſyſtem; and becauſe all the notes that are conſonant muſt ſtand perpendicularly over each other, that the notes belonging to each part may be diſtinctly known, they may be made with ſuch differences as ſhall not confound or alter their ſignification as to time, but only ſhew that they belong to this or that part. Thus we ſhall ſee how the parts paſs through one another, and which in every note is higheſt, loweſt, or uniſon.

It muſt be obſerved, that for the performance of one ſingle piece, the clefs only ſerve for explaining the intervals in the lines and ſpaces; ſo that the firſt note may be taken high or low, as we pleaſe: for as the proper uſe of the ſcale is not to limit the abſolute degree of tunes, ſo the proper uſe of the ſigned clef is not to limit the pitch at which the firſt note of any piece is to be taken, but to terminate the tune of the firſt with relation to the firſt, and conſidering all the parts together, to determine the relation of the ſeveral notes, by the relation of their clefs in the ſcale: and, in effect, in performing any ſingle part, the clef may be taken in any octave, provided we do not go too high or too low for finding the reſt of the notes of a ſong: but in a concert of ſeveral parts, all the clefs muſt be taken not only in the relation, but alſo in the places of the ſyſtem abovementioned, that every part may be comprehended in it.

CLEFTS, or Cracks *in the Heels*, a diſeaſe incident to horſes, that comes either by over-hard labour, which occaſions ſurfeits, or by giving them unwholeſome meat, or by waſhing them when hot. For the cure, ſhave away the hair, and apply the oil of hempſeed, or linſeed; and be ſure to keep them clean.

CLEMATIS, virgin's bower, in botany, a genus of plants, the flower of which conſiſts of four or five oblong lax petals: there is no pericarpium, but a ſmall receptacle contains ſeveral roundiſh compreſſed ſeeds, crowned with a ſlender filament ſomewhat like a feather.

CLEPSYDRA, an inſtrument or machine ſerving to meaſure time by the fall of a certain quantity of water.

The word comes from κλεπτω, *condo*, and ὑδωρ, *aqua*, water.

There have likewiſe been clepſydræ made with mercury.

The Egyptians, by this machine, meaſured the courſe of the ſun. Tycho Brahe, in our days, made uſe of it to meaſure the motion of the ſtars, &c. and Dudley uſed the ſame contrivance in making all his maritime obſervations.

The uſe of clepſydræ is very ancient: they were invented in Egypt under the Ptolemies; as were alſo ſundials. Their uſe was chiefly in the winter; the ſundials

CLOGS, a kind of wooden pattens without rings. See the article PATTEN.

The term clogs is alſo uſed for pieces of wood faſtened about the necks or legs of beaſts, to prevent their running away.

CLOISTER, *Clauſtrum*, an habitation ſurrounded with walls, and inhabited by religious.

In a more general ſenſe it is uſed for a monaſtery of religious of either ſex. In the firſt ſenſe, it is the principal part of a regular monaſtery, being a ſquare ſurrounded with walls or buildings. It is commonly placed between the church, the chapter-houſe, and refectory, underneath the dormitory.

The cloiſters, in ancient monaſteries, ſerved for ſeveral purpoſes: it was here the monks held their lectures; the lectures of morality at the north ſide, next the church; the ſchool on the weſt; and the chapter on the eaſt; ſpiritual meditations, &c. being reſerved for the church.

CLOSE *Behind*, in the manege, a horſe whoſe hoofs come too cloſe together: ſuch horſes are commonly good ones.

To cloſe a paſſade juſtly, is when the horſe ends the paſſade with a demivolt in good order, well narrowed and rounded, and terminating upon the ſame line upon which he parted; ſo that he is ſtill in a condition to part from the hand handſomely, at the very laſt time or motion of his demivolt.

CLOSE, in muſic. See CADENCE.

CLOSE-HAULED, in the ſea-language, a certain ſituation of diſpoſing the ſails of a ſhip to make a progreſs in the neareſt direction poſſible to the point from which the wind bloweth, or to the direction of the wind (ſee the next article). A ſhip commonly ſails at this time within about ſix points of it; but ſloops and other ſmall veſſels will frequently go almoſt a point nigher, and all veſſels are ſuppoſed when cloſe-hauled to make nearly a point of lee-way, even when they have the advantage of a good ſailing breeze and ſmooth water: lee-way always increaſes in proportion to the riſing of the wind and ſea. Lee-way is known to be an angle included between a ſhip's real and apparent progreſs; as a ſhip having the wind at north, and being cloſe hauled, ſhe will ſtem E N E one way, and W N W the other; but as ſhe will make a point of lee-way, her courſe will be only E by N one way, and W by N the other.

Cloſe-hauling, therefore, is arranging the ſails ſideways; ſo that the wind, as it croſſes the ſhip obliquely from forward towards the ſtern, may fill them; but as the wind likewiſe enters the cavities of the ſails in an oblique direction, its force is conſiderably diminiſhed in giving head-way, and therefore the ſhip makes the leaſt progreſs when ſailing in this manner, at which time the lower corners of the ſails are ſtretched fore and aft, or lengthways; and the weather or windward-edges of all ſuch as are fixed upon yards, are drawn tight forward by ropes called bow-lines, which are faſtened up and down in three or four places to keep the ſail ſteady. See BOWLINE-BRIDLE.

CLOSE-QUARTERS, in naval affairs, certain ſtrong thick fences of wood ſtretching acroſs a merchant-ſhip in ſeveral places: they are uſed as a place of retreat when a ſhip is boarded by her enemy, and are therefore fitted with ſeveral ſmall muſket holes, from which the ſhip's crew can defend themſelves and annoy the enemy: they are likewiſe fortified with ſeveral ſmall caiſſons called powder-cheſts, which are fixed upon the deck filled with powder, and can be fired at any time from the cloſe-quarters upon the boarders. See the article BOARDING.

"When the enemy is determined to board, it will be moſt expedient to keep firing your blunderbuſſes out of the look-holes in the quarter, among his men, as they ſtand thick to enter: as ſoon as he is aboard, ſpring your powder-cheſts upon the quarter; for then his men in mounting your quarter will be numerous: let your men in the round-houſe be ready to give the enemy a volley with their ſmall arms as ſoon as they come upon your quarter-deck; thoſe who are quartered in the fore-caſtle muſt keep a watchful eye on the poop that they do no miſchief there, and likewiſe fire at them as they mount the ſhrouds.

"If the enemy come in numbers upon the quarter-deck, diſcharge your cannon from the round-houſe with caſe-ſhot at them, and if a breach is expected before they are re-loaded, toſs out hand-grenadoes amongſt them; then ſpring your powder-cheſts, as the laſt remedy; for it is prudence in a commander to let theſe ſtand as long as poſſible, becauſe they not only ſtrike a terror into the enemy, but are at all times ready; and ſo long as they are ſtanding he will conclude you are in no great extremity.

"From all places have an eye to your rigging, that the enemy do not cut the ſails looſe; and be ſure to aim at the leading men: having ſprung your powder-cheſts upon the ſides, after the enemy is aboard, turn all hands to the bulk-heads in readineſs to receive the firſt attack, which will be the briſkeſt; for being ſide by ſide, his men will enter upon the fore-caſtle, main-deck, and quarter-deck: if all this while the maſter be exemplary brave, and the men fire with diſcretion, they will ſoon make the crew of a conſiderable ſhip leave ſo hot a place, as this muſt conſequently be, &c." *Capt. Park's Defenſive War by Sea.*

CLOSET, in building, denotes a very ſmall room, generally without any chimney: it is eſteemed one great improvement of our modern architects.

CLOSET, in heraldry, denotes the half of a bar. See the article BAR.

CLOSH, among farriers, the ſame with founder. See the article FOUNDER.

CLOTH, in commerce, a manufacture made of wool wove on the loom.

The term is applicable alſo to other manufactures made of hemp, flax, &c. but in a more particular ſenſe it implies the web or tiſſue of woollen threads interwoven, ſome whereof, called the warp, are extended in length from one end of the piece to the other; the reſt, called the woof, diſpoſed acroſs the firſt, or breadth-wiſe of the piece.

Cloths are of divers qualities, fine or coarſe. The goodneſs of cloth, according to ſome, conſiſts in the following particulars. 1. That the wool be of a good quality, and well dreſſed. 2. It muſt be equally ſpun, carefully obſerving that the thread of the warp be finer and better twiſted than that of the woof. 3. The cloth muſt be well wrought and beaten on the loom, ſo as to be every where equally compact. 4. The wool muſt not be finer at one end of the piece than in the reſt. 5. The liſt muſt be ſufficiently ſtrong, of the ſame length with the ſtuff, and muſt conſiſt of good wool, hair, or oſtrich-feathers, or, what is ſtill better, of Daniſh dog's hair. 6. The cloth muſt be free from knots, and other imperfections. 7. It muſt be well ſcoured with fuller's-earth, well fulled with the beſt white ſope, and afterwards waſhed in clear water. 8. The hair or nap muſt be well drawn out with the teazle, without being too much opened. 9. It muſt be ſhorn cloſe without making it threadbare. 10. It muſt be well dried. 11. It muſt not be tenter-ſtretched to force it to its juſt dimenſions. 12. It muſt be preſſed cold, not hot-preſſed, the latter being very injurious to woollen cloth.

Manufacturing of white Cloths which are intended for dying.

The beſt wool for the manufacturing of cloths are thoſe of England and Spain, eſpecially thoſe of Lincolnſhire and Segovia. To uſe thoſe wools to the beſt advantage, they muſt be ſcoured, by putting them into a liquor ſomewhat more than lukewarm, compoſed of three parts fair water, and one of urine. After the wool has continued long enough in the liquor to ſoak, and diſſolve the greaſe, it is drained and well waſhed in running water. When it feels dry, and has no ſmell but the natural one of the ſheep, it is ſaid to be duly ſcoured.

After this, it is hung to dry in the ſhade, the heat of the ſun making it harſh and inflexible: when dry, it is beat with rods upon hurdles of wood, or on cords, to cleanſe it from duſt, and the groſſer filth; the more it is thus beat and cleanſed, the ſofter it becomes, and the better for ſpinning. After beating, it muſt be well picked, to free it from the reſt of the filth that had eſcaped the rods.

It is now in a proper condition to be oiled, and carded on large iron cards, placed ſlopewiſe. Olive oil is eſteemed the beſt for this purpoſe; one fifth of which ſhould be uſed for the wool intended for the woof, and a ninth for that deſigned for the warp. After the wool has been well oiled, it is given to the ſpinners, who firſt card it on the knee with ſmall fine cards, and then ſpin it on the wheel, obſerving to make the thread of the warp ſmaller by one third than that of the woof, and much compacter twiſted.

The thread thus ſpun, reeled, and made into ſkeins; that deſigned for the woof is wound on little tubes, pieces of paper, or ruſhes, ſo diſpoſed, as that they may be eaſily put in the eye of the ſhuttle. That for the warp is wound on a kind of large wooden bobbins, to diſpoſe it for warping. When warped, it is ſtiffened with ſize, the beſt of which is that made of ſhreds of parchment, and when dry is given to the weavers, who mount it on the loom.

The warp thus mounted, the weavers, who are two to each loom, one on each ſide, tread alternately on the treddle, firſt on the right ſtep, and then on the left, which raiſes and lowers the threads of the warp equally; between which they throw tranſverſly the ſhuttle from the one to the other; and every time that the ſhuttle is thus thrown, and a thread of the woof inſerted within the warp, they ſtrike it conjunctly with the ſame frame, wherein is faſtened the comb or reed, between whoſe teeth the threads of the warp are paſſed, repeating the ſtroke as often as is neceſſary.

The weavers having continued their work till the whole warp is filled with the woof, the cloth is finiſhed; it is then taken off the loom by unrolling it from the beam whereon it had been rolled in proportion as it was wove; and now given to be cleanſed of the knots, ends of threads, ſtraws, and other filth, which is done with iron nippers.

In this condition it is carried to the fullery, to be ſcoured with urine, or a kind of potter's clay, well ſteeped in water, put along with the cloth in the trough wherein it is fulled: the cloth being again cleared from the earth or urine, is returned to the former hands to have the leſſer filth, ſmall ſtraws, &c. taken off as before: then it is returned to the fuller to be beat and fulled with hot water, wherein a ſuitable quantity of ſope has been diſſolved; after fulling, it is taken out to be ſmoothed, or pulled by the liſts lengthwiſe, to take out the wrinkles, crevices, &c.

The ſmoothing is repeated every two hours, till the fulling be finiſhed, and the cloth brought to its proper breadth; after which it is waſhed in clear water, to purge it of the ſope, and given wet to the carders to raiſe the hair or nap on the right ſide with the thiſtle or reed. After this preparation, the cloth-worker takes the cloth, and gives it its firſt cut or ſheering: then the carders reſume it, and after wetting, give it as many more courſes with the teazle, as the quality of the ſtuff requires, always obſerving to begin againſt the grain of the hair, and to end with it; as alſo to begin with a ſmoother thiſtle, proceeding ſtill with one ſharper and ſharper, as far as the ſixth degree.

After theſe operations, the cloth being dried, is returned to the cloth-worker, who ſheers it a ſecond time, and returns it to the carders, who repeat their operation as before, till the nap be well ranged on the ſurface of the cloth, from one end of the piece to the other.

The cloth thus wove, ſcoured, napped and ſhorn, is ſent to the dyer: when dyed, it is waſhed in fair water, and the worker takes it again wet as it is, lays the nap with a bruſh on the table, and hangs it on the tenters, where it is ſtretched both in length and breadth ſufficiently to ſmooth it, ſet it ſquare, and bring it to its proper dimenſions, without ſtraining it too much; obſerving to bruſh it afreſh, the way of the nap, while a little moiſt on the tenters.

When quite dry, the cloth is taken off the tenters and bruſhed again on the table, to finiſh the laying of the nap; after which it is folded, and laid cold under a preſs to make it perfectly ſmooth and even, and give it a gloſs.

Laſtly, the cloth being taken out of the preſs, and the papers, &c. for gloſſing it removed, it is in a condition for ſale or uſe.

With regard to the manufacture of mixed cloths, or thoſe wherein the wools are firſt dyed, and then mixed, ſpun and wove of the colours intended, the proceſs, except what relates to the colour, is moſtly the ſame with that juſt repreſented.

Cloths, in painting, are pieces of canvas prepared by proper primings for the uſe of painters, and ſold at the colour ſhops.

But cloths prepared at the colour-ſhops are liable to many inconveniencies. In the firſt place, the whole covering is apt to peel and crack off from the cloth, by the improper texture of the under coat, which is formed of ſize and whiting; and is both too brittle, and too little adheſive, either to the cloth or upper coat, to anſwer the purpoſe properly. In the ſecond place, the oil uſed in the compoſition of any paint applied on ſuch grounds, is extremely apt to be abſorbed or ſucked in by them; and conſequently to leave the colours, with which it was mixed, deſtitute in a great degree of what is neceſſary for their proper temperament. This is called, though improperly, "The ſinking in of the colours," and is attended with ſeveral inconveniencies; particularly, that the effect of the painting appears very imperfectly while the colours are in this ſtate, and deprives the painter, as well as others, of the power of judging properly of the truth of the performance. It is indeed practiſed ſometimes to varniſh over the ground, which will prevent the ſinking in: but there is a hazard in this, that the upper coat may leave the ground, and the painting conſequently come off. Whoever therefore would have good cloths, free entirely from this diſadvantage, muſt direct the preparation of them themſelves; and they may produce them in perfection by the following means.

"Let the cloths be firſt well ſoaked with drying oil laid on hot, and when nearly dry, let two or three coats of drying oil and red-oker, mixed as thick as can be worked, be ſpread over it: then, the laſt being dry, let the cloth be bruſhed over with hot drying oil, as long as it appears to ſink in: and laſtly, let it be covered with a coat of white lead and oil, rendered grey, or of any other colour deſired, by admixture of the proper pigments. This laſt coat may be poliſhed to a due degree by rubbing with a pumice ſtone, or by glazing it with a glaſs poliſher uſed for linen, and called a callender ſtone."

CLOUD, a collection of vapours ſuſpended in the atmoſphere. That the clouds are produced in the air, from almoſt water alone, there is ſcarce any one that doubts. But water, every where equally diſpoſed, is tranſparent. Clouds, therefore, are collected from what is beginning to be water; but the parts of which, in the mean time, are circumvolved among one another with an unequal motion, neither reſting nor moving equably. If the water that is floating about in the air, mounts higher and higher, its particles at length arrive in places ſo far above the earth, that they are not any longer much united together, but receding from each other, they do not then conſtitute water, but only the elements of it. But when theſe elements of water come to deſcend again from thoſe upper regions, and are contracted into ſmaller ſpaces, where they aſſociate together, and become a kind of water, they then form clouds. The higher, therefore, the water aſcends in the air, the ſerener and drier the weather will be, and the freer from clouds; and the contrary.

But water is carried up to a very conſiderable height in the air; for in Carniola, in the neighbourhood of Venice, there are mountains ten thouſand two hundred ſeventy-four geometrical feet high, on the tops of which there are indications of moiſture: and on the higheſt tops of thoſe mountains nature preſents to our view perpetual ſnows; a certain proof of the elevation of water to ſuch heights. Nay, over the mountain Teneriff, the higheſt in Europe, there conſtantly, about noon, hang fogs, or little white clouds, which are daily reſolved into water, which flows in ſuch plenty down the mountain, that it ſupplies the place of ſhowers, and waters the whole iſland, without rain. We are certain therefore that water aſcends to ſuch a height. But had we ſufficient obſervations to confirm the account Maignan of Tholouſe gives, in his treatiſe of *Perſpective*, p. 93, of the wonderful phænomenon, which, he ſays, he had obſerved, the aſcent of the water in the atmoſphere would be found to be much higher: for he tells us, that in a very clear night, and at midnight too, there appeared, in the month of Auguſt, an exceeding bright little cloud, which ſpread itſelf almoſt as far as the zenith; and he ſays, that Riccius obſerved the ſame thing in the neighbourhood of Rome; and from theſe obſervations he infers, that clouds may be elevated beyond the projection of the earth's ſhadow. But this projection being aſtronomically computed from the given time and place of the appearing cloud, would give a prodigious diſtance from the earth; and hence, perhaps, that appearance was rather to be aſcribed to ſome other unknown cauſe, reſiding in the upper regions of the air, and exceedingly lucid, ſince on the tops of the higheſt mountains there are rarely obſerved any clouds, but, on the contrary, to a ſpectator placed there, they appear below him towards the plain.

CLOVE-TREE, in botany, the Engliſh name of the caryophyllus of botaniſts. See the article CARYOPHYLLUS.

CLOVE, a term uſed in weights of wool. Seven pounds make a clove.

In Eſſex, eight pounds of cheeſe and butter go to the clove.

CLOVE-JULY-FLOWER, the Engliſh name of the caryophyllus aromaticus. See the article CARYOPHYLLUS.

CLOVER, a ſpecies of the trifolium. See the article TRIFOLIUM.

Clover is greatly cultivated in England for feeding of cattle, and is eſteemed very profitable, becauſe the great quantity of cattle which this graſs will maintain, does very much enrich all clayey lands, and prepare them for corn in two or three years, which is the length of time that this crop will continue good.

In the choice of this ſeed, that which is of a bright yellowiſh colour, a little inclining to brown, ſhould be preferred; but the black rejected as good for little.

Ten pounds of this ſeed will be ſufficient for an acre of ground; for if the plants do not come up pretty thick, it will not be worth ſtanding. The land in which this is ſown ſhould be well ploughed, and harrowed very fine, otherwiſe the ſeeds will be buried too deep, and thereby loſt.

The beſt time to ſow it is about the beginning of Auguſt, at which ſeaſon the autumnal rains will bring up the plants in a ſhort time; whereas, when the ſeeds are ſown in the ſpring, if it be done very early, they are many times burſt with wet and cold; and if it be done late, they are in danger of miſcarrying from drought: whereas in autumn, when the ground has been warmed by the ſummer's heat, the rains then falling greatly promote the vegetation of ſeeds and plants.

The ſeeds ſhould be harrowed in with buſhes; for, if it be done with a common harrow, they will be buried too deep.

Moſt people have recommended the ſowing of this ſeed with ſeveral ſorts of corn: but if it be ſeaſoned, as before directed, it will be much better if ſown alone; for the corn prevents the growth of the plants until it is reaped and taken off the ground, ſo that one whole ſeaſon is loſt; and many times, if there be a great crop of corn upon the ground, it ſpoils the clover, ſo that it is hardly worth ſtanding; whereas, in the way before directed, the plants will have good roots before winter; and in the ſpring will come on much faſter than that which was ſown the ſpring before under corn.

About the middle of May this graſs will be fit to cut, and there ſhould be great care taken in making it; for it will require a great deal more labour and time to dry than common graſs, and will ſhrink into leſs compaſs; but if it be not too rank, it will make extraordinary rich food for cattle. The time for cutting it is when it begins to flower; for if it ſtands much longer, the lower part of the ſtems will begin to dry, whereby it will make a leſs quantity of hay, and that not ſo well flavoured.

Some people cut three crops in one year of this graſs; but the beſt way is to cut it once in the ſpring, and feed it the remaining part of the year, whereby the land will be enriched, and the plants will grow much ſtronger.

One acre of this graſs will feed as many cattle as four or five acres of common graſs: but great care ſhould be taken of the cattle when they are firſt put into it, leſt it burſt them. To prevent which, ſome turn them in for a few hours only at firſt, and ſo ſtint them as to quantity; and this by degrees, letting them at firſt be only one hour in the middle of the day, when there is no moiſture upon the graſs, and ſo every day ſuffering them to remain a longer time, until they are fully ſeaſoned to it: but great care ſhould be had never to turn them into this food in wet weather; or, if they have been for ſome time accuſtomed to this food, it will be proper to turn them out at night in wet weather, and let them have hay, which will prevent the ill conſequences of this food: but there are ſome who give ſtraw to their cattle, while they are feeding upon this graſs, to prevent the ill effects of it; which muſt not be given them in the field, becauſe they will not eat it where there is plenty of better food. There are others who ſow rye graſs amongſt their clover, which they let grow together, in order to prevent the ill conſequences of the cattle feeding wholly on clover: but this is not a commendable way, becauſe the rye graſs will greatly injure the clover in its growth.

Where the ſeeds are deſigned to be ſaved, the firſt crop in the ſpring ſhould be permitted to ſtand until the ſeeds are ripe, which may be known by the ſtalks and heads changing to a brown colour; then it ſhould be cut in a dry time: and when it is well dried, it may be houſed until winter, when the ſeeds ſhould be threſhed out; but if the ſeeds are wanted for immediate ſowing, it may be threſhed out before it is either houſed or ſtocked; but then it muſt be well dried, otherwiſe the ſeeds will not quit their huſks.

It has been a great complaint among the farmers, that they could not threſh out theſe ſeeds without great labour and difficulty; which muſt be chiefly owing to their cutting the ſpring crop when it begins to flower, and to leave the ſecond crop for ſeed, which ripens ſo late in autumn, that there is not heat enough to dry the huſks ſufficiently; whereby they are tough, and the ſeed rendered difficult to get out; which may entirely be remedied by leaving the firſt crop for ſeed, as hath been directed.

When the cattle are fed with this hay, the beſt way is to put it in racks, otherwiſe they will tread a great quantity of it down with their feet. This feed is much better for moſt other cattle than milch cows, ſo that theſe ſhould rarely have any of it, leſt it prove hurtful to them, though, when it is dry, it is not near ſo injurous to any ſort of cattle, as when green.

CLOUGH, or DRAUGHT, among traders, an allowance of two pound to every three hundred weight, for the turn of the ſcale, that the commodity may hold out when ſold by retail.

CLOUTS, in military affairs, are thin plates of iron nailed on that part of the axle-tree of a gun's carriage which comes through the nave, through which the linſpin goes.

CLOYED, or ACCLOYED, among farriers, a term uſed when a horſe is pricked with a nail in ſhoeing.

CLYSSUS, in chemiſtry, an extract prepared not from one but ſeveral bodies mixed together: and among the moderns, the term is applied to ſeveral extracts procured from the ſame body, and then mixed together. Thus, if from wormwood we draw the water, ſpirit, oil, ſalt, and tincture, and according to the rules of art re-unite theſe into a maſs compounded of them all, and containing the joint virtues of all, we have a clyſſus of wormwood. To this claſs are reducible many of the nobleſt productions of chemiſtry, as the more curious ſapos, and an infinite number of others.

CLYSSUS *of Antimony* is a liquor obtained by diſtillation from a mixture of antimony, nitre, and ſulphur. It is preſcribed to feveriſh patients, in order to procure a grateful acidity to their potions, and to ſuch as labour under a loſs of appetite.

CLYSTER is a liquid remedy to be injected chiefly at the anus into the larger inteſtines. It is uſually adminiſtered by the bladder of a hog, ſheep, or ox, perforated at each end, having at one of the apertures an ivory pipe faſtened with pack-thread. But the French, and ſometimes the Dutch, uſe a pewter ſyringe, by which the liquor may be thrown in with more eaſe and expedition than with the bladder, and likewiſe more forcibly expelled into the large inteſtines. This remedy ſhould never be adminiſtered either too hot or too cold, but tepid; for either of the former will be injurious to the bowels.

Clyſters are prepared of different ingredients, according to the different intentions propoſed, whether to ſoften the indurated fæces, correct the acrid, acid, and ſaline recrements, evacuate the contents of the large inteſtines, corroborate the languid fibres of the inteſtines, and augment their impaired periſtaltic motion; to mitigate the ſpaſms of the inteſtinal coats, and relax their conſtricted fibres; to cauſe a revulſion downwards in lethargic diſorders, apoplexies, frenzies, and other diſorders of the head; to promote labour, whether the fœtus be living or dead; and to expel the ſecundines where they are preternaturally detained.

Clyſters are ſometimes uſed to nouriſh and ſupport a patient who can ſwallow little or no aliment, by reaſon of ſome impediment in the organs of deglutition; in which caſes they may be made of broth, milk, ale, and decoctions of barley and oats with wine. The Engliſh introduced a new kind of clyſter, made of the ſmoke of tobacco, which has been uſed by ſeveral other nations, and appears to be of conſiderable efficacy when other clyſters prove ineffectual, and particularly in the iliac paſſion, and in the hernia incarcerata, though it may likewiſe be uſed in an obſtinate conſtipation or obſtruction of the bowels, &c. See Heiſter's Surgery, and Graſſius's and Sawzonius's Diſſertations upon the ſubject.

COACH, a commodious vehicle for travelling, ſo well known as to need no deſcription. Their invention was owing to the French, about the reign of Francis I. They have, like other things, been brought to their preſent perfection by degrees: at preſent they ſeem to want nothing, either with regard to eaſe or magnificence.

COACH, or COUCH, in naval affairs, a cabbin or large apartment near the ſtern of a large ſhip of war, the floor of which is the ſame with the quarter-deck; it is always the habitation of the captain.

COADJUTOR is properly uſed for a prelate joined to another to aſſiſt him in the diſcharge of his function, and even in virtue thereof to ſucceed him.

COAGULATION, in a general ſenſe, imports a certain change in the ſtate of any liquor, by means of which, inſtead of retaining its fluidity, it becomes more or leſs conſiſtent, according to the degree of coagulation.

COAGULUM is the ſame with what in Engliſh we call rennet, or rather the curd formed thereby. See RENNET.

COAGULUM ALUMENOSUM, in pharmacy, is made by ſtirring any quantity of whites of eggs with a piece of alum of a proper ſize in a tin veſſel, till they are coagulated; ſaid to be good in defluxions of the eyes.

COAL, a black, ſulphureous, inflammable matter, dug out of the earth, and ſerving for fuel in many countries.

Cannel COAL; ſee CANNEL *Coal*.

Char COAL. See the article CHARCOAL.

COASTING, in agriculture, denotes the tranſplanting a tree, and placing it in the ſame ſituation with reſpect to eaſt, weſt, ſouth, and north, as it ſtood in before it was tranſplanted.

COASTING, in navigation, the act of making a progreſs along the ſea-coaſt of any land: the principal articles relating to this part of navigation are obſerving the motion of the tide, ſounding, and keeping a good look out.

COAT, or COAT *of Arms*, in heraldry, a habit worn by the ancient knights over their arms both in war and tournaments, and ſtill borne by heralds at arms. It was a kind of fur-coat, reaching as low as the navel, open at the ſides with ſhort ſleeves, ſometimes furred with ermine and hair, upon which were applied the armories of the knights embroidered in gold and ſilver, and enamelled with beaten tin-coloured black, green, red, and blue; whence the rule never to apply colour on colour, nor metal on metal. The coats of arms were frequently open, and diverſified with bands and fillets of ſeveral colours, alternately placed, as we ſtill ſee cloths ſcarleted, watered, &c. Hence they were called deviſes, as being divided and compoſed of ſeveral pieces ſewed together; whence the words falſe, pale, chevron, bend, croſs, ſaltier, lozenge, &c. which have ſince become honourable pieces or ordinaries of the ſhield. See the articles CROSS, BEND, CHEVRON, &c.

Coats of arms and banners were never allowed to be worn by any but knights and ancient nobles.

COAT, in naval affairs, a piece of tarred canvas nailed round that part of the maſts or bowſprit where they riſe out of the ſhip. It is uſed to prevent the water from running down into the ſhip's hold.

COATING, in chemiſtry, implies the covering a retort, or other veſſel, with a compoſition called lute, in order to prevent the action of the fire from melting the glaſs. See LUTE.

COBALT, in natural hiſtory, a ſingular ſpecies of arſenical ore.

In its purer ſtates it is conſiderably compact and heavy, and not unfrequently of a ſemi-metallic appearance. Its texture is always fine, ſometimes granulated or compoſed of minute grains ranged into ſmall ſtriæ; ſometimes ſmooth and even, without any diſtinguiſhable grains. Its colour is ſometimes a pale iron grey, ſometimes a darker bluiſh or blackiſh grey. From variations in the appearance of the mineral itſelf, or from its different admixtures, ſome of the mineralogiſts have divided it into diſtinct ſpecies, the principal of which are the following. 1. Dark grey cobalt; compact, ponderous, and of a very fine grain. This ſort is ſaid to be the moſt eſteemed at the Saxon works, and to afford the fineſt blue glaſs. 2. Bright pale grey or aſh-coloured cobalt; of a ſomewhat looſer ſtructure, and leſs ponderous. This kind has a great reſemblance to the arſenical pyritæ, and ſome of the white ſilver and copper ores; from which thoſe who are accuſtomed to the inſpection of theſe minerals diſtinguiſh it pretty readily, by the colour of the cobalt being ſomewhat duller, and its texture finer. 3. Vitreous cobalt; in ſtructure reſembling melted ſcoria or glaſs, of a bright bluiſh grey colour; called by the Germans ſchlacken kobold, ſlag cobalt. 4. Cryſtalliform cobalt, affecting chiefly a cubical figure, ſometimes perfect, but commonly with the angles imperfect. 5. Specular cobalt; intermixed with glittering talky flakes. 6. Earthy cobalt; blended with various earths into ſoft friable compounds, of a black yellowiſh grey, or other colours. 7. Flowers of cobalt. Theſe are of a looſe radiated ſtructure, and generally not ſo heavy as the foregoing ores. The external parts are of a fine purpliſh red, a violet, or a peach bloom colour: ſometimes the whole maſs is elegantly tinged with theſe colours throughout, but more commonly the internal parts are of a greyiſh or leaden hue. They are never found in great quantities, or forming regular veins; but only in detached maſſes, lodged in clefts of ſtone, in places to which the air has had free acceſs. They appear to proceed from a ſpontaneous reſolution of ſome of the foregoing minerals; moſt of which are found upon experiment to yield nearly ſimilar efflореſcences on being expoſed in heaps for a length of time to a moiſt air. Wherever the workmen meet with theſe flowers, they expect a rich vein of cobalt in the neighbourhood.

The cobalt mines of Schneeberg are ſaid to be two or three hundred fathoms deep; and the cobalt lodged at great depths to be of a better quality than that which is near the ſurface. The Schneeberg-hill, according to the ancient chronicles of Saxony, yielded at firſt only an iron ore; which on ſinking deeper, about the beginning of the fourteenth century, was ſucceeded by a very rich ore of ſilver: this alſo, being at length exhauſted, gave place to cobalts. Some pieces of the cobalt ores are ſtill found to participate of ſilver, and even of gold: Schluter relates, that he has ſometimes obtained after the proportion of three ounces of gold and upwards upon the hundred pounds. Theſe metals however, far from being eſſential, as ſome have raſhly ſuppoſed, to all cobalts, are entirely accidental even to this; nor are they equally diffuſed through thoſe maſſes in which they happen to be lodged; different pieces containing different proportions, and ſome none at all.

Cobalt has been met with in ſome parts of England;

at Mendip-hills in Somerſetſhire, and in Cornwall; in which laſt county it has of late been dug in conſiderable quantity, though not entirely agreeing in quality to the accounts given by authors of the ſorts which are manufactured in Saxony. It is ſuppoſed that the Chineſe, and more particularly the Japoneſe, had formerly mines of cobalt, with which were painted the fine blues of their ancient porcelains; but that theſe mines are now exhauſted, and that the inferior blues of their preſent ware are painted with the Saxon zaffre imported to them by the Dutch.

COBWEB, in phyſiology, the fine network which ſpiders ſpin out of their own bowels, in order to catch their prey.

COCCIFEROUS Plants, the ſame with bacciferous. See Bacciferous.

COCCOGNIDIUM, or Granum Cnidium, is the berry of a ſhrub, growing wild in Germany in moiſt ſhady woods, called by an Arabic name *Mezereon*, and from its leaves bearing ſome reſemblance to thoſe of the bay and of the olive-tres, *Laureola* and *Chamelæa*. The ſpecies which produce the coccognidia is named, by Caſpar Bauhine, *Laureola folio deciduo, flore purpureo, officinis Laureola femina*. The flowers come forth early in the ſpring before the leaves; they are ſmall, monopetalous, ſhaped ſomewhat like a funnel, of a pale purpliſh red colour, and an agreeable ſmell, whilſt all the other parts of the plant are diſagreeable. The leaves, which follow the flowers, are ſoft, of a pale green colour, without any gloſſineſs. The ſtalks and branches are very flexible, covered with two barks; the outermoſt of which is of an aſh-colour, thin, and eaſily peeled off; the innermoſt green on the outſide, white within, very tough, and hard to tear. The berries are at firſt green, afterwards red, and when ripe of a brown colour: they are much about the ſize and partly of the appearance of pepper-corns: they contain under the outward brown ſkin, another thin ſmooth one, commonly greeniſh and gloſſy; and under this a third, which looks as if coated with black varniſh; under this lies the kernel, of a white colour, and about the ſize of a grain of hemp-ſeed. The berries are uſed by the dyers in Germany; but unknown among the artiſts of our country.

COCCULUS INDICUS, in natural hiſtory, the berry of an oriental plant, ſuppoſed to be a ſpecies of *Solanum*, and called, by Ray, *Solanum racemoſum Indicum*, &c. or Indian tree nightſhade, producing its fruit in cluſters like grapes. The berries are brought to us from Alexandria and other parts of the Levant. They are partly about the ſize of bay berries, and partly of that of chich-peas; roundiſh, but hollowed in a little towards the ſtalk, and approaching to a kidney ſhape, rough on the outſide, and of a grey-browniſh or blackiſh colour: the freſher they are, the heavier; the older, the drier and lighter.

In their ſtructure, they greatly reſemble the coccognidia, conſiſting of two ſhells and a kernel, in which laſt their activity reſides: the outer ſhell is thin, the inner thicker and whitiſh; the kernel is more manifeſtly of a kidney-ſhape than the entire berry, when freſh of a white colour, but very apt to grow yellow and brown: it ſoon likewiſe becomes rancid, and is preyed on by worms, inſomuch that moſt of the berries, as we commonly meet with them, are found to be mere ſhells without any kernel.

It is principally employed in ointments for deſtroying cutaneous inſects, and in fiſhing. For this laſt purpoſe, a mixture of the powdered cocculus with rye-meal, old cheeſe, ſpirit of wine, and other ſubſtances, is formed into ſmall pellets or pills, which are uſed as a bait, or only thrown by themſelves into waters ſtocked with fiſh: the fiſhes by ſwallowing the pills, are ſtupified and benumbed, ariſe to the ſurface, and may be eaſily caught by the hands.

COCCYX, or Coccygis Os, in anatomy, a bone ſituated at the extremity of the os ſacrum. See the article Osteology.

The figure of it is ſomething like that of an inverted pyramid, a little bent forwards towards the pelvis: in adults it is uſually of a ſingle bone; but in younger ſubjects it conſiſts of three or four fruſtæ; and in infants it is merely cartilaginous. In quadrupeds of many kinds, this bone is long, compoſed of a number of fruſtæ, is bent forward, and in beaſts conſtitutes the tail; in this caſe it is called the os caudæ.

COCHIN-CHINA, a kingdom of India, ſituated between 104° and 190° eaſt long. and between 10° and 17° north lat. being bounded by the kingdom of Tonquin on the north, by the Indian ocean on the eaſt and ſouth, and by the kingdom of Cambodia on the weſt: it is upwards of four hundred miles long, and one hundred and fifty broad, producing chiefly ſilk and rice.

COCHINEAL, in natural hiſtory, a ſmall, irregular, roundiſh body, internally of a red colour. It is brought chiefly from New Spain, and there collected from a plant, which is now common in the botanic gardens of Europe, called *opuntia*, or prickly pear-tree.

It was formerly ſuppoſed to be the entire fruit or berry of the tree, wrinkled and ſhrivelled by drying: when the pear itſelf became known, cochineal was ſuppoſed to be its ſeeds; but it differs greatly from theſe alſo, as well as from the entire pear. It is now known with certainty to be not a vegetable but an animal ſubſtance; to be a particular ſpecies of inſect produced upon the tree.

To what claſs of inſects cochineal belongs, has been diſputed; ſome affirming that it has ſix feet, and no wings, and reſembles a bug; others, that it has four wings, and is a ſpecies of ſcarabæus, or lady-bird; others, that like ſeveral kinds of caterpillars and worms, it has neither wings nor feet; and others, that it is an inſect in its imperfect or chryſalis ſtate, incloſed in a pellicle or huſk. All theſe opinions are in part true: the cochineal inſect, like many others, goes through a variety of forms; though the rich red colour, for which it is valued, it poſſeſſes only in one of them. On examining carefully ſeveral hundred weights of cochineal as brought to us, we have ſeen ſome grains in all the ſtates abovementioned.

In its advanced ſtate, it is a ſmall ſcarabæus, or ſheath-winged inſect, with ſix feet: the body is roundiſh, hemiſpherical on the upper part, flat underneath, full of circles or rings, of a blackiſh-brown colour; the covers of the wings are red, with a yellow ſpot on each. The ſcarabæus depoſites on the leaves of the opuntia, ſmall eggs, from each of which comes forth a little inſect, reſembling a flea or tick; when this increaſes, it looks like a worm or caterpillar, with ſix ſmall feet, ſcarcely to be ſeen, on the fore part of its body. It crawls among the leaves, and chooſes ſuch ſituations where it may be beſt ſecured from rain and other inclemencies of weather. After theſe have attained to their full growth, they contract themſelves, and at the ſame time become redder and redder. A pellicle is formed all over them, and they adhere motionleſs, as if fixed with glue, upon the leaves, which now look as if covered with fine red berries. This ſtate continues about ten or twelve days, when the huſk opens, and diſcovers a winged ſcarabæus again, which has very little of the deep red colour of the maggot or chryſalis. The ſcarabæus lays its eggs, and then ſucceed the ſame transformations as before.

Great care is taken in the preſervation and curation of theſe valuable inſects, in defending them from rain, cold, and heat, from being preyed on by birds, &c. in houſing them at certain ſeaſons, and in collecting and drying them for uſe: the particular methods followed for theſe purpoſes, are not certainly known.

The inſect is doubtleſs collected in its red imperfect maggot-ſtate; and hence the grains of cochineal, as brought to us, have rarely any appearance either of feet or wings: if taken whilſt ſome of them are ſtill crawling about, or if the collection is deferred till ſome of them are transformed into winged ſcarabæi, the quality of the cochineal is debaſed in proportion to ſuch admixture. Some report, that the berries, as they are called, are taken off from the leaves by means of certain inſtruments; but how the ſkins or huſks are ſeparated, we have no account. In the Philoſophical Tranſactions, N°. 193, it is ſaid, that a ſmoky fire is made on the windward ſide of the tree; and that the inſects, killed by the ſmoke, fall ſpontaneouſly, or are eaſily ſhaken off, upon linen ſheets ſpread underneath, and are afterwards dried in the ſun. Ruiſcher mentions three ways of killing them; one by hot water, which renders them brown on the outſide; another on hot iron ſhovels, which ſcorches them to a blackiſh hue; and the third in ovens, where they acquire aſh-coloured variegations. Others report, that after they have been killed by the ſteam of hot water, hot aſhes are ſtrewed upon them, and that the white colour is owing to theſe: there is no probability of this; for we have taken ſeveral of the grains out of their external involucrum or huſk, and found them naturally ſtreaked with white; beſides that, this whiteneſs is greater than that of aſhes, and is not to be rubbed off, as aſhes externally adhering would be.

Freſh cochineal loſes in drying about two-thirds of its weight.

The dried cochineal is ſorted into large entire grains, and ſmall or broken ones; the firſt are called by the Spaniards, *Grana*, the latter *Granilla*. In trade four ſorts are diſtinguiſhed, *Meſteque*, *Tetreſchale*, and *Sylveſter*; of which the firſt is accounted the beſt, and the laſt the worſt: the three former are named from the places where they are produced; the latter, from its being found wild, without any culture. The differences in the cultivated cochineal are very conſiderable, depending partly upon the climate and ſeaſon, partly upon the curation, and partly upon the ſpecies of plant.

The fruit of the opuntia itſelf is of a red colour, and is ſaid, when eaten, to tinge the urine red: thoſe ſorts whoſe fruit is of the deepeſt red colour, are obſerved to produce the fineſt cochineal. Sir Hans Sloane diſtinguiſhes the beſt ſpecies by the name of *Opuntia maxima, folio oblongo rotundo majore, ſpinulis obtuſis mollibus & innocentibus obſito, flore ſtriis rubris variegato*; the very large opuntia, with an oblong roundiſh large leaf, beſet with ſoft blunt harmleſs ſpines, and a flower variegated with red ſtreaks. In the Memoirs of the French Academy for the year 1714, another ſpecies is preferred, namely, that called by Tournefort, *Opuntia major validiſſimis ſpinis ſive aculeis munita*, the greater opuntia armed with very ſtrong ſpines or prickles.

The beſt cochineal is ſomewhat heavy, or at leaſt not very light, moderately compact, clean, dry, of a gloſſy ſurface, of a dark blackiſh red colour on the outſide, with white ſilver-like ſtreaks. Chewed, it tinges the ſpittle of a deep browniſh-red colour, and impreſſes a kind of faint not agreeable taſte. When thoroughly dry, it has no ſmell; when moiſt, a ſomewhat muſty one.

Cochineal, infuſed or boiled in water, imparts a crimſon tincture, inclining to purple. After the more ſoluble parts have been got out by light infuſion or coction, the tinctures extracted from the remainder by ſucceſſive freſh parcels of water, have more and more of a purple hue. Woolen cloth, prepared by boiling with a little alum and tartar, acquires a crimſon dye on being boiled with a proper quantity of cochineal in fine powder.

The beauty of crimſon, as Mr. Hellot obſerves, (from whoſe *Art de Teindre*, great part of the remainder of this article is extracted) is to incline as much as poſſible to the gridelin, or to be extremely deep. Fixed alkaline ſalts give the deſirable deepneſs, but tarniſh the colour and diminiſh its luſtre. Volatile alkalies have the ſame good effect as the fixed, without their bad one; but the great volatility of theſe ſalts occaſions them to be ſo plentifully diſſipated from the hot liquor, that a very large quantity would be neceſſary to effectually anſwer the purpoſe. Mr. Hellot, however, has diſcovered a method of applying them to good advantage: the cloth, dyed crimſon in the uſual manner, is dipt in a ſolution of a little ſal ammoniac; and as ſoon as the liquor grows moderately warm, a quantity of pot-aſh, equal to that of the ſal ammoniac, is thrown in: the volatile alkali of the ſal ammoniac is inſtantly extricated, and communicates to the cloth the brilliancy and deepneſs required.

A ſmall quantity of the vitriolic acid, dropped into a decoction of cochineal, changes it to a purple: on adding more and more of the acid, the liquor becomes fleſh coloured, and at laſt colourleſs. Spirit of nitre, in like manner gradually dropped in, firſt inclines the colour to yellow, then turns it quite yellow, and at laſt almoſt deſtroys it; the acid diſſolving or attenuating the colouring particles, ſo as to render them indiſtinguiſhable by the eye.

Solution of tin in aqua-regia heightens the colour into a ſcarlet, more or leſs fiery, that is, blended with more or leſs of a yellow hue, in proportion to the quantity of the ſolution: the liquor, thus heightened, communicates its own ſcarlet colour to woolen cloth prepared by boiling with tartar.

Other metallic ſolutions have not this effect. Zinc, diſſolved in ſpirit of nitre, changes the red of cochineal to a ſlaty violet: ſolution of biſmuth in ſpirit of nitre, diluted with an equal quantity of water, and dropped into a decoction of cochineal, produced, on prepared cloth dipped therein, a very beautiful and lively turtle-grey. A ſolution of copper in ſpirit of nitre, undiluted, gave a dirty crimſon: ſolution of cupelled ſilver, a ſomewhat tawny cinnamon colour: ſolution of gold, a kind of marbled cheſnut, the cloth appearing as if compoſed of wool of different colours: ſolution of mercury, in ſpirit of nitre, nearly the ſame: tincture of biſmuth ore, in ſpirit of nitre, a purple almoſt violet, as beautiful as if the cochineal had been applied upon cloth previouſly dyed of a ſky-blue. Vitriolated tartar deſtroyed the red colour of the cochineal, and produced a grey, though the ingredients of that ſalt, ſeparately, have a different effect.

The dyers are ſaid to prepare their ſolution of tin for ſcarlet, by pouring upon the metal a quantity of aquafortis diluted with water, with the addition ſometimes of a little nitre, which is ſuppoſed to contribute ſomewhat to the uniformity of the colour. Aqua fortis does not perfectly diſſolve this metal; and what it does diſſolve at firſt, it ſoon depoſites again, in form of a thick mucilage; the clear liquor retaining ſcarcely any thing of the metal. The proper menſtruum of tin is aqua-regia, or a mixture of the nitrous acid either with the marine, or with neutral ſalts containing it, as common ſalt and ſal ammoniac. If eight ounces of ſpirit of nitre be diluted with an equal quantity of water, and half an ounce of ſal ammoniac, and two drams of nitre, diſſolved in the mixture; the menſtruum ſo prepared will diſſolve, and keep diſſolved, about an ounce of tin, provided the metal be previouſly reduced into grains or ſmall parts, and very leiſurely dropped into the liquor, grain by grain, waiting till one is diſſolved before another is put in. This ſolution depoſites no mucilage; it becomes indeed opake and milky in the great heats of ſummer, but in cold weather it reſumes its limpidneſs and tranſparency; and even in its milky ſtate, Mr. Hellot ſays, it is found to anſwer as well in every reſpect for dying ſcarlet as when it is tranſparent; whilſt the ſolutions made in the common manner, when once they have grown thick or opake, which they do in a day or two or leſs, cannot be employed at all for that uſe.

Woolen cloth requires, for being dyed ſcarlet, about one ſixteenth its weight of cochineal; a part of which is uſed along with the tartar in the preparatory liquor, from which the cloth receives a lively fleſh-colour, and the reſt for finiſhing the dye; a ſuitable quantity of the ſolution of tin being added in both decoctions.

The copper veſſels employed for the dying of other colours that require boiling, are leſs proper for ſcarlet; the acid liquor being apt to diſſolve a part of the copper, which precipitates a proportionable quantity of the tin, and deadens the colour and ſtains the cloth. Tin veſſels are commonly made uſe of, and are undoubtedly the moſt ſafe and certain. Their expenſiveneſs however, and the great precaution neceſſary to keep them from melting, have induced ſome of the French dyers to ſearch for means of making the proceſs ſucceed in copper ones: by keeping the coppers extremely clean, and confining the cloth in a net, ſo as not to touch the ſides, they are ſaid to have produced ſcarlets ſcarcely, if at all, inferior to thoſe dyed in tin veſſels.

The ſcarlet proves darker, or of a more fiery orange colour, according as the ſolution of tin is uſed in ſmaller or larger quantity. Hence too great darkneſs is eaſily remedied by adding more of the ſolution; the cloth being previouſly taken out, and the additional acid mixed thoroughly with the liquor before it is put in again. Scarlet which has too much fire, is darkened by paſſing it through warm water; and if the exceſs is greater than this can remedy, by diſſolving in the water a little alum;

but the injury which an over-proportion of the acid ſolution does to the cloth, is irremediable.

Some of the French dyers give fire to their ſcarlets, without any injurious quantities of the acid, by the addition of a yellow drug, turmeric; but the luſtre which the turmeric gives, like the dye of the turmeric by itſelf, ſoon periſhes. It is obſervable, that the ſcarlet dye is only ſuperficial, the internal part of the cloth being white: when yellow drugs are added, they do not make the ſcarlet ſink, but ſink themſelves through the whole ſubſtance of the cloth, and thus are readily diſcovered upon cutting.

All urinous and alcaline ſubſtances ſtain ſcarlet to a crimſon, by deſtroying the effect of the acid: if ſcarlet cloth be boiled in alcaline ley, it becomes firſt crimſon, then purpliſh, and on continuing the coction, gives out the whole of its colour to the liquor; from which the colouring matter may be precipitated, by adding a ſolution of alum, into a crimſon lake.——Hence in pure country air, ſcarlet retains its luſtre much longer than in large cities, where alcaline and urinous vapours are more abundant. The dirt of roads, and ſundry ſubſtances of the acid kind, leave no ſtain in ſcarlet, if the part be waſhed immediately with pure water and a white linen cloth. If the dirt is ſuffered to dry, a blackiſh violet ſpot will remain, which can be taken out only by mild vegetable acids, as vinegar, citron juice, a warm dilute ſolution of white tartar, or ſour bran water. If theſe acids, however, be not applied with a good deal of addreſs, whilſt they take out the blackiſh ſtain, they leave a yellow one, by diſſolving the colouring particles of the cochineal itſelf.

It is obſervable, that if a piece of ſcarlet be boiled in the liquor by which cloth is prepared for receiving this dye, it loſes immediately great part of its colour; which, if freſh pieces of white cloth are boiled along with it, will be imbibed by them, and equally diſtributed among them all. After the boiling has been continued about an hour, it will be difficult to diſtinguiſh that which had been ſcarlet from thoſe which were white.

After all the common proceſſes of dying with cochineal, there is found at the bottom of the veſſels a conſiderable quantity of a deep brown-coloured ſediment. This is found when ſolution of tin has been uſed in the dye, to contain a calx of tin, from which the tin may be recovered, though with ſome difficulty, by fuſion with inflammable ſubſtances.

The reſt of the ſediment appears to conſiſt of the impurities of the tartar, and the groſſer parts of the powdered cochineal. The lighter animal matter being waſhed off with water, dried, ground on a marble with an equal quantity of cryſtals of tartar into an impalpable powder, and then put into water with a little alum; a piece of white cloth, boiled in this liquor for three quarters of an hour, acquired a very beautiful crimſon dye.

This experiment evinces, that by reducing cochineal into a powder of moderate fineneſs, as commonly practiſed, we do not gain all the advantage which this valuable commodity is capable of yielding. If the cochineal, after the uſual pulverization, be mixed with one fourth its weight of fine dry cryſtals of tartar, and the mixture levigated into a powder really impalpable; the ſaving in the cochineal, whether for the crimſon or the ſcarlet dye, will be, according to Mr. Hellot, about one part in four. Though no tartar is uſually employed in the red, or dying liquor, the quantity here directed does no injury; it appeared on trial, that the colour was rather the more ſolid for it. In the preparatory liquor, the quantity of tartar may be diminiſhed proportionably to that contained in the powder.

The wild cochineal, or ſylveſter, is greatly inferior to the fine ſort, called ſimply cochineal: four parts of the former have no greater effect in dying than one of the latter. Nor does the ſylveſter anſwer in general, ſo well as the other in regard to the beauty of the colour, particularly for ſcarlet.

COCHLEA, the ſnail-ſhell, in zoology, a genus of univalve ſhell fiſh, of a ſpiral figure, and containing only one cell.

Cochlea, in anatomy, the third part of the labyrinth of the ear. See Ear.

It is placed oppoſite to the ſemicircular canals, and formed in the manner of a ſnail-ſhell, making its progreſs two turns and a half, in a ſpiral form. In this we are to remark the nucleus, and the canal, which is divided into two by a ſpiral lamina; the upper of theſe opens into the veſtibulum, and is called ſcala veſtibuli: and the lower, which terminates in the hollow of the tympanum, through the feneſtra rotunda, is called ſcala tympani.

Cochlea, the ſcrew, in mathematics. See the article Screw.

COCHLEARIA, ſcurvy graſs, in botany, a low plant, with thick juicy leaves, ſomewhat hollowed ſo as to reſemble a ſpoon, thoſe from the root ſtanding on long pedicles, thoſe on the ſtalk joined cloſe to it without pedicles; producing, towards the upper part of the ſtalks, ſmall white teterapetalous flowers, followed by roundiſh ſeed-veſſels. It annually grows wild in ſeveral parts of England, particularly about the ſea-coaſts and ſalt marſhes, and flowers in May, or ſooner.

Cochlearia *Hortenſis*, garden, or Dutch ſcurvy-graſs, with the radical leaves unevenly roundiſh, and thoſe on the ſtalks oblong. It is commonly cultivated for the uſe of the ſhops in gardens; and does not appear like many other maritime plants, to change its qualities with the ſoil.

Cochlearia *Marina, ſeu Britannica*, Engliſh, or ſea-ſcurvy graſs, with all the leaves alike; oblong, pointed, deeply and irregularly indented or ſinuated.

The freſh leaves of theſe plants have an ungrateful nidorous kind of ſmell, and a penetrating acrid taſte: the firſt ſort is conſiderably the ſtrongeſt, and hence has long ſuperſeded the uſe of the other. The flowers and ſeeds alſo are notably pungent, but leſs ſo than the leaves.

Scurvy-graſs is a powerful antiſeptic, attenuant, and aperient: it manifeſtly promotes the ſenſible ſecretions, particularly urine, without heating or irritating ſo much as might be expected from its great pungency. It is one of the capital antiſcorbutic herbs, and in this intention has been principally made uſe of, in conjunction, generally, with mild vegetable acids, or ſubſtances of leſs acrimony, as orange juice, ſorrel, becabunga, &c. It is of ſervice alſo in paralytic and cachectic indiſpoſitions; and in the wandering rheumatic pains, of long continuance, unaccompanied with a fever, called by Sydenham the ſcorbutic rheumatiſm. We have had frequent experience of the efficacy of the compoſition which he preſcribes in this commonly obſtinate diſtemper, and which he ſays, if the public had not outweighed private advantage, he ſhould have concealed; to wit, ſixteen parts of freſh made conſerve of garden ſcurvy-graſs, eight of conſerve of wood ſorrel, and ſix of the compound powder of arum root, made up with ſyrup of orange peel into an electuary, of which two drams are to be taken thrice a day for a month, along with ſome ounces of a diſtilled water impregnated with ſcurvy-graſs, mint, nutmegs, &c. Among different aromatic materials made trial of for covering the ill flavour of ſcurvy-graſs, nutmegs ſeemed to anſwer the beſt.

The principal virtue of this plant reſides in an eſſential oil; ſeparable, in very ſmall quantity, by diſtillation with water. The oil is ſo ponderous as to ſink in the aqueous fluid; but of great volatility, ſubtility, and penetration. One drop, diſſolved in ſpirit, or received on ſugar, communicates to a quart of wine, or other liquors, the ſmell and taſte of ſcurvy-graſs. It riſes in diſtillation with rectified ſpirit as well as with water: a pint of rectified ſpirit, drawn off, in the heat of a water bath, from two pounds of the freſh herb bruiſed, brings over nearly all the oil, and proves exceeding ſtrongly impregnated with the volatile pungency of the ſcurvy-graſs. Both the oil and the ſpirit, particularly the former, require the bottles they are kept in to be very carefully ſecured; the ſubtile matter of the plant, when thus diſengaged by diſtillation from the groſſer parts, being extremely diſpoſed to eſcape.

COCK, *Gallus*, in zoology, the Engliſh name of the males of gallinaceous birds, but more eſpecially uſed for the common dunghill-cock.

Cock's Comb, in botany, a name given to a ſpecies pedicularis, as well as to a ſpecies of amaranth. See the articles PEDICULARIS and AMARANTH.

COCK-THROPLED, among dealers in horſes, is ſaid of a horſe whoſe wind-pipe is ſmall, and bends like a bow, when he bridles his head.

COCK-WATER, among miners, a ſtream of water, brought into a trough, to waſh away the ſand from tin ore, while ſtamping in the mill.

COCKATOON, in ornithology, the ſame with macao. See the article MACAO.

COCKET is a ſeal belonging to the king's cuſtom-houſe, or rather a ſcroll of parchment ſealed and delivered by the officers of the cuſtoms to merchants, as a warrant that their merchandiſes are cuſtomed.

COCKLE, in the hiſtory of ſhell-fiſh, the Engliſh name of the pectunculus. See the article PECTUNCULUS.

COCOA, or CACAO, in botany. See the article CACAO.

COCOON, in natural hiſtory, the pod, or neſt of the ſilk-worm.

COCOS, or Coco, is a nut, the ſhell of which is much uſed by turners, carvers, &c. for divers works.

While the nuts are new, and the bark tender, they yield each about half a pint of clear cooling water, which in a little time becomes firſt a white ſoft pulp, and at length condenſes, and aſſumes the taſte of the nut. The tree yields fruit thrice a year, and thoſe ſometimes as big as a man's head; but the cocos of the Antilles are not ſo large as thoſe of the Eaſt Indies. In the kingdom of Siam, the cocos-fruit dried and emptied of its pulp, ſerves as a meaſure both for things liquid and dry.

COD FISH, in ichthyology, is the largeſt of the genus of the aſelli, called *aſellus maximus* by authors, and ſometimes *aſellus varius, ſive ſtriatus.* The characters by which this is diſtinguiſhed from other fiſhes of the ſame genus are theſe: its colour on the back and ſides is a duſky olive, variegated with yellow ſpots; its belly is white; its ſides have a long white line running their whole length, from the gills to the tail, which at the abdomen is curved, but elſewhere is ſtraight; its ſcales are very ſmall, and adhere firmly to the ſkin; its eyes are large; at the angle of the lower jaws there hangs a ſingle beard, which is ſhort, ſeldom exceeding a finger's length; its tongue is broad; it has ſeveral rows of teeth, one of which is much longer than all the others. Among theſe there are ſome moveable teeth, as in the pike; and in the palate, near the orifice of the ſtomach, and near the gills, it has ſmall cluſters of teeth. It has three back fins, two at the gills, and two at the breaſt, and two others behind the anus; and the tail is plain.

CODE, *Codex*, a collection of the laws and conſtitutions of the Roman emperors, made by order of Juſtinian.

The Code is accounted the ſecond volume of the civil law, and contains twelve books, the matter of which is nearly the ſame with that of the Digeſts, eſpecially the firſt eight books; but the ſtyle is neither ſo pure, nor the method ſo accurate as that of the Digeſts; and it determines matters of daily uſe, whereas the Digeſts diſcuſs the more abſtruſe and ſubtle queſtions of the law, giving the various opinions of the ancient lawyers. Although Juſtinian's code is diſtinguiſhed by the appellation of Code, by way of eminence, yet there were codes before his time; ſuch were the Gregorian code and Hermogenean code, collections of the Roman laws made by two famous lawyers, Gregorius and Hermogenes, which included the conſtitutions of the emperors from Adrian to Diocleſian and Maximinus. 2. The Theodoſian code, compriſed in ſixteen books, formed out of the conſtitutions of the emperors from Conſtantine the Great to Theodoſius the Younger: this was obſerved almoſt over all the Weſt, till it was abrogated by the Juſtinian code. There are alſo ſeveral later codes, particularly the ancient Gothic, and thoſe of the French kings, as the code of Euridic, code-Lewis, code-Henry, code-Marchande, code des Eaux, &c. and the preſent king of Pruſſia has lately publiſhed a code which comprizes the laws of his kingdom in a very ſmall volume.

CODIA, among botaniſts, ſignifies the head of any plant, but more particularly a poppy-head, whence its ſyrup is called diacodium.

CODICIL is a writing by way of ſupplement to a will, when any thing is omitted which the teſtator would have added, or wants to be explained, altered, or recalled. It is of the ſame nature with a will or teſtament, except that it is made without an executor; and one may leave behind him but one will, though as many codicils as he pleaſes. There is this further difference between a codicil and a teſtament, that a codicil cannot contain the inſtitution of an heir, and is not ſubject to the ſame formalities preſcribed by law for ſolemn teſtaments. Codicils are always taken as part of the teſtament, and ought to be annexed to the ſame; and the executor is bound to ſee them performed: and in caſe they are detained from him, he may compel their delivery up in the ſpiritual court.

COECUM, in anatomy, the firſt of the three large inteſtines, called, from their ſize, inteſtina craſſa. The cœcum is ſituated at the right os ilium, and reſembles a bag, and has a vermiform appendage fixed to it. It begins at the termination of the ilium, and terminates in the bottom of the bag which it forms: its length is not more than three or four fingers in breadth. In the appendage, opening into the ſide of the cœcum, there are ſome glands, which, together with its erect ſituation, as that is uſually the caſe, ſeems to ſhew that ſome fluid is ſecreted there. In hens, this is double, as alſo in many other fowls. In fiſhes there are frequently a vaſt number of them; in ſome ſpecies, no leſs than four hundred, according to Dr. Grew. In man this appendage is, at the utmoſt, ſingle, and is often wanting.

COEFFICIENTS, in algebra, are ſuch numbers, or known quantities, as are put before letters or quantities, whether known or unknown, and into which they are ſuppoſed to be multiplied. Thus, in $3x$, ax, or bx; 3, a and b, are the coefficients of x; and in $6a$, $9b$; 6, and 9, are the coefficients of a and b.

COELESTIAL, in general, denotes any thing belonging to the heavens: thus we ſay, cœleſtial obſervations, the cœleſtial globe, &c.

Cœleſtial obſervations are thoſe made by aſtronomers upon the phænomena of the heavenly bodies, with a ſuitable apparatus of aſtronomical inſtruments, in order to determine their places, motions, &c. The inſtruments chiefly made uſe of, in aſtronomical obſervations, are the aſtronomical gnomon, quadrant, micrometer, and teleſcope. See the articles GNOMON, QUADRANT, &c.

Obſervations in the day-time are eaſy, in regard the croſs-hairs in the focus of the object-glaſs of the teleſcope are then diſtinctly perceivable: in the night, thoſe croſs-hairs are to be illumined, to make them viſible. This illumination is either performed by a candle placed obliquely near them, ſo as the ſmoke does not intercept the rays; or where this is inconvenient, by making an aperture in the tube of the teleſcope, near the focus of the object-glaſs, through which a candle is applied to illumine the croſs-rays.

Obſervations on the ſun are not to be made without placing a glaſs, ſmoaked in the flame of a lamp or candle, between the teleſcope and the eye.

COELESTIAL *Globe.* See the article GLOBE.

COELIAC ARTERY, in anatomy, that artery which iſſues from the aorta, juſt below the diaphragm.

The trunk of this artery is very ſhort, and near its origin it ſends off from the right ſide two ſmall diaphragmatic branches, ſometimes only one; and is afterwards diſtributed into right and left, communicating with other arteries of the ſame name, which come from the intercoſtal and mammary arteries.

The right branch of this ſends off the right gaſtric and epiploic, the pancreatic and the duodenic, the hepatic and the double cyſtic arteries.

The left branch of it ſends off the left gaſtric and epiploic arteries, the gaſtro-epiploic, the great ſplenic, and alſo many of the pancreatic arteries.

COELIAC PASSION, in medicine, a kind of flux, or diarrhœa, wherein the aliments, either wholly changed, or only in part, paſs off by ſtool.

Dr. Freind ſays, that the moſt rational and ſucceſsful method of treating the cœliac paſſion, is to adminiſter ſuch remedies as gently ſtimulate the inteſtinal tube, and deterge the obſtructed glands: for this purpoſe, purges adminiſtered in ſmall quantities, and frequently repeated, and gentle vomits of ipecacuanha are recommended.

Authors frequently confound the cœliac paſſion with the lientery, but they are different. See the article Lientery.

Coeliac Diabetes, called alſo cœliaca urinalis, is a diſorder wherein the chyle paſſes off, along with, or inſtead of urine. See the article Diabetes.

Coeliac Vein, in anatomy, that running through the inteſtinum rectum, along with the cœliac artery.

COEMETRY, *Cœmeterium*, the ſame with cemetery. See the article Cemetery.

COENOBITE, in church hiſtory, one ſort of monks in the primitive Chriſtian church. They were ſo called κατα τȣ κοινȣ βιȣ, from living in common, in which they differed from the anachorites, who retired from ſociety. See Anachoret.

The cœnobitic life, ſays Caſſian, took its riſe from the times of the apoſtles, and was the ſtate and condition of the firſt Chriſtians, according to the deſcription given of them by St. Luke, in the Acts.

Coenobite, in a modern ſenſe, is a religious who lives in a convent or community, under certain rules.

CO-EQUALITY, among Chriſtian divines, a term uſed to denote the equality of the three perſons in the Trinity.

CO-ETERNITY, among Chriſtian divines, imports the eternal exiſtence of two or more beings: it is chiefly uſed in ſpeaking of the perſons of the Trinity.

COEUR, in heraldry, a ſhort line of partition in pale, in the center of the eſcutcheon, which extends but a little way, much ſhort of the top and bottom, being met by other lines, which form an irregular partition of the eſcutcheon.

CO-EXISTENCE, the exiſtence of two or more things at the ſame time.

COFFEE, in commerce, the berry or fruit of a tree growing naturally in Arabia, and was not known in Europe till the year 1650. It is now cultivated alſo in Perſia, in the Eaſt-Indies, particularly the iſland Java, and in America. It is raiſed likewiſe in botanic gardens in different parts of Europe, but not without ſhelter and artificial heat. Prince Eugene's noble garden at Vienna produced coffee more than ſufficient for his own conſumption.

The tree is uſually ſmall, though ſometimes it riſes to the height of 20, 30, and even 40 feet: it is an evergreen, and at all ſeaſons of the year is found loaded with flowers and fruit. The flower is highly odoriferous, and reſembles that of the jaſmine, of which the coffee-tree is held a ſpecies. Juſſieu calls it *Jaſminum Arabicum lauri folio, cujus ſemen apud nos café dicitur*. The Arabians name the tree *bun*, or *ban*, whence perhaps the common expreſſion of coffee beans: the dietetic infuſion prepared from the ſeeds, they call cahouch, or coave, whence coffee or caffee. The entire fruit ſomewhat reſembles a cherry: it contains, under a pulpy ſkin, an oval kernel, which ſeparates longitudinally into two parts, each covered with a thin ſhell, and marked with a furrow on the flat ſide, where they were joined. The ripe fruit is thoroughly dried in the ſun, and heavy wooden or ſtone rollers paſſed over it; by which the ſeeds are parted, and the ſkins or ſhells broken, ſo as to be ſeparated by winnowing.

Three ſorts of coffee are diſtinguiſhed in trade; Arabian or Levant, Eaſt-Indian or Java, and Weſt-Indian or Surinam coffee: the firſt is the ſmalleſt, and of a ſomewhat darker yellow colour than the other ſorts; the ſecond is the largeſt and of the paleſt yellow; the third, of a middling ſize, and in colour greeniſh. The green colour of this laſt may probably proceed from its coming over freſher than the others, or perhaps from its not attaining to ſuch a degree of maturity. All the ſorts are green in their unripe ſtate; and even thoſe, which by maturity or age have acquired the darkeſt yellow or browniſh colour, give a green tincture to water.

The peculiar flavour, for which coffee is admired, is communicated by roaſting: common beans, peas, and other farinaceous ſubſtances, receive from that proceſs a ſimilar flavour, and have been ſometimes uſed as ſuccedanea to coffee, and fraudulently mixed, by the venders of that commodity, with ſuch as is ſold in powder. Dillenius has given an expreſs diſſertation (in the *Ephem. Nat. Curioſo.*) on the ſubſtances which in ſmell and taſte reſemble coffee; and finds that roaſted *rye* and roaſted almonds come the neareſt to it.

With regard to the medical qualities of coffee, the common infuſions, or rather decoctions of it appear to be in general innocent; to be little diſpoſed to produce the ill effects aſcribed to them by ſome, and to have little claim to the extraordinary virtues for which they are recommended by others. Simon Paulli was the firſt who condemned the uſe of coffee as well as tea: but his prejudices againſt it are built on no better foundation than a ridiculous hiſtory related in Olearius's Travels.

COFFER, a long ſquare box, of the firmeſt timber, about three feet long, and one and a half broad, wherein tin-ore is broken to pieces in a ſtamping-mill. See the articles Tin and Mill.

Coffer, in architecture, a ſmall depreſſion or ſinking of each interval between the modillions of the Corinthian cornice; generally filled up with a roſe, ſometimes with a pomegranate, &c.

Coffer, in fortification, a hollow lodgment athwart a dry moat, from ſix to ſeven feet deep, and from ſixteen to eighteen broad; the upper part being made of pieces of timber, raiſed two feet above the level of that moat, which little elevation has hurdles, laden with earth for its covering, and ſerves as a parapet with embraſures.

COFFERER *of the King's houſhold*, a principal officer in the court, next under the comptroller, who, in the compting-houſe, and elſewhere at other times, has a ſpecial charge and overſight of the other officers of the houſe, for their good demeanor and charge in their offices, to all which he pays their wages.

COFFIN, in the manege, the whole hoof of a horſe's foot, above the cronet, including the coffin-bone, the ſole, and the fruſh.

Coffin-Bone is a ſmall ſpongy bone, incloſed in the midſt of the hoof, and poſſeſſing the whole form of the foot.

COGGESHALL's *Sliding Rule*. See the article Sliding Rule.

COGNATION, in the civil law, a term for that line of conſanguinity which is between males and females, both deſcended from the ſame father; as agnation is for the line of parentage between males only deſcended from the ſame ſtock.

COGNISEE, or Connusee, in law, is the perſon to whom a fine of lands, &c. is acknowledged, &c.

COGNISOR, or Connuser, is he that paſſeth or acknowledgeth a fine of lands and tenements to another.

COGNIZANCE, or Connusance, in law, has divers ſignifications: ſometimes it is an acknowledgment of a fine, or confeſſion of ſomething done; ſometimes the hearing of a matter judicially, as to take cognizance of a cauſe, and ſometimes a particular juriſdiction, as cognizance of pleas is an authority to call a cauſe or plea out of another court, which no perſon can do but the king, except he can ſhew a charter for it. This cognizance is a privilege granted to a city or town, to hold plea of all contracts, &c. within the liberty; and if any one is impleaded for ſuch matters in the courts at Weſtminſter, the mayor, &c. of ſuch franchiſe may demand cognizance of the plea, and that it be determined before them.

CO-HABITATION, among civilians, denotes the ſtate of a man and a woman who live together like huſband and wife, without being legally married.

CO-HEIR, one who ſucceeds to a ſhare of an inheritance, to be divided among ſeveral.

COHESION, in philoſophy, that action by which the particles of the ſame body adhere together, as if they were but one.

The cauſe of this coheſion has extremely perplexed the philoſophers of all ages. In all the ſyſtems of phyſics, matter is ſuppoſed, originally, to conſiſt of minute indiviſible atoms; but how, and by what principle theſe ſeveral and diſtinct corpuſcles ſhould come firſt combined into little ſyſtems, and how they ſhould come to perſevere in that ſtate of union, is a point not yet determined: a point of the greateſt difficulty, and even of the greateſt importance of any in phyſics. J. Bernoulli thinks it owing to the preſſure of the atmoſphere; others, to the figure of the component particles; but the generality, with Sir Iſaac Newton, to attraction. See the article ATTRACTION.

COHOBATION, in chemiſtry, the returning a liquor diſtilled from any ſubſtance back upon the ſame ſubſtance, and diſtilling it again, either with or without an addition of freſh ingredients.

COHORT, *Cohors*, in Roman antiquity, the name of part of the Roman legion, comprehending about ſix hundred men.

COIF, the badge of a ſerjeant at law, who is called ſerjeant of the coif, from the lawn-coif they wear under their caps when they are created ſerjeants.

COIN, a ſpecies of money, made of metal, as gold, ſilver, or copper. Hence coin differs from money, as the ſpecies does from the genus; money being any matter, whether metal, wood, leather, glaſs, horn, fruits, ſhells, &c.

It ſeems derived from the French, *coign*; that is, *angulus*, a corner; whence it has been held, that the moſt ancient ſort of coin was ſquare with corners.

It is one of the royal prerogatives belonging to every ſovereign prince, that he alone, in his own dominions, may order the quantities, value, and faſhion of his coin: but the coin of one king is not current in the kingdom of another, unleſs at a great loſs; though our king, by his prerogative, may make any foreign coin lawful money of England at his pleaſure, by proclamation. By ſtatute any perſon may break or deface any piece of coin ſuſpected to be counterfeited or diminiſhed, otherwiſe than by wearing: but if ſuch pieces, on breaking, &c. are found to be good coin, it will be at the breaker's peril, who ſhall ſtand to the loſs of it. Coins of gold or ſilver are to paſs, notwithſtanding ſome of them are cracked or worn; but not if they are clipped. Counterfeiting, clipping, or impairing the king's coin, is high treaſon; as alſo the making any ſtamps, dye, mould, &c. for coining, except by perſons employed in the mint, &c. and the conveying ſuch out of the mint is the ſame, and ſo is colouring metal, reſembling gold or ſilver coin, marking it on the edges, &c. The ſtatutes which ordained milled money to be made, give liberty to any perſon to refuſe hammered ſilver coin, as not being the lawful coin of this kingdom: counterfeiting the coin extends only to gold and ſilver; for the coining of halfpence or farthings, or pieces to go for ſuch, of copper, incurs a penalty of five pounds for every pound weight.

COIN, in architecture, a kind of dye, cut diagonalwiſe, after the manner of the flight of a ſtair-caſe; ſerving at bottom to ſupport columns in a level; and at top to correct the inclination of an entablature, ſupporting a vault.

COIN is alſo uſed for a ſolid angle, compoſed of two ſurfaces inclined towards each other; whether that angle be exterior, as the coin of a wall, &c. or interior, as the coin of a chamber or chimney.

COINING, or COINAGE, the ſtamping and making money. Formerly the fabric of coins was different from what it is at preſent. They cut a large plate of metal into ſeveral little ſquares, the corners of which they cut off with ſhears. After having ſhaped theſe pieces, ſo as to render them perfectly conformable in point of weight to the ſtandard-piece, they took each piece in hand again, to make it exactly round by a gentle hammering. This was called a planchet, and was fit for immediate coining. Then engravers prepared, as they ſtill do, a couple of maſſes of ſteel, in form of dyes, cut and terminated by a flat ſurface, rounded off at the edges. They engraved or ſtamped on it the hollow of a head, a croſs, a ſcutcheon, or any other figure, according to the cuſtom of the times, with a ſhort legend. As one of theſe dyes was to remain dormant, and the other moveable, the former ended in a ſquare priſm, that it might be introduced into the ſquare hole of the block, which being fixed very faſt, kept the dye as ſteady as any vice could have done. The planchet of metal was horizontally laid upon this inferior maſs, to receive the ſtamp of it on one ſide, and that of the upper dye, wherewith it was covered on the other. This moveable dye, having its round engraved ſurface reſting upon the planchet, had at its oppoſite extremity a flat, ſquare, and larger ſurface; upon which they gave ſeveral heavy blows with a hammer of an enormous ſize, till the double ſtamp was ſufficiently in relievo impreſſed on each ſide of the planchet. This being finiſhed, was immediately ſucceeded by another; and they thus became a ſtandard-coin, which had the degree of fineneſs, the weight and mark, determined by the judgment of the inſpectors, to make it good current money. The ſtrong tempering which was, and is ſtill, given to the two dyes, rendered them capable of bearing thoſe repeated blows. Coining has been conſiderably improved and rendered expeditious by ſeveral ingenious machines, and by a wiſe application of the ſureſt phyſical experiments to the methods of fining, trying, and ſtamping the different metals. The three fineſt inſtruments the mint-man uſes are, the laminating engine, the machine to mill the edges of coins, and the preſs.

After they have taken the laminæ or plates of metal out of the mould into which they are caſt, they do not beat them on the anvil, as was formerly done; but they make them paſs and repaſs between the ſeveral rollers of the laminating engine; which, being gradually brought cloſer and cloſer to each other, preſently give the laminæ its uniform and exact thickneſs. Inſtead of dividing the laminæ into ſmall ſquares, they at once cut clean out of it as many planchets as it can contain, by means of a ſharp ſteel trepan, of a round figure, hollow within, and of a proportionable diameter, to ſhape and cut off the piece at one and the ſame time. After theſe planchets have been compared and weighed with ſtandard-pieces, filed or ſcraped, to get off the ſuperfluous part of the metal, and then boiled and made clean; they arrive at laſt at the machine (plate XXXVII. *fig* 15.) which marks them upon the edge, and finally the preſs (*fig.* 17.) which ſqueezing each of them ſingly between the two dyes brought near each other, with one blow forces the two ſurfaces or fields of the piece to fill exactly all the vacancies of the two figures engraved hollow. The engine, which ſerves to laminate lead, gives a ſufficient notion of that which ſerves to flatten gold and ſilver laminæ between rollers of a leſſer ſize.

The principal pieces of the machine (*fig.* 15.) to ſtamp coins on the edge, are two ſteel laminæ, about a line thick. One half of the legend, or of the ring, is engraved on the thickneſs of one of the laminæ, and the other half on the thickneſs of the other; and theſe two laminæ are ſtraight, although the planchet marked with them be circular.

When they have a mind to ſtamp a planchet, they firſt put it between the laminæ, in ſuch a manner, as that theſe being each of them laid flat upon a copper plate, which is faſtened upon a very thick wooden table, and the planchet being likewiſe laid flat on the ſame plate, the edge of the planchet may touch the two laminæ on each ſide, and in their thick part. One of theſe laminæ is immoveable, and faſtened with ſeveral ſcrews; the other ſlides by means of a dented wheel, which takes into the teeth that are on the ſurface of the laminæ. This ſliding laminæ makes the planchet turn in ſuch a manner, that it remains ſtamped on the edge, when it has made one turn. Only crown or half crown pieces can bear the impreſſion of letters on the thickneſs of their edges.

The coining engine or preſs is ſo handy (ſee plate XXXVII. *fig.* 17.) that a ſingle man may ſtamp twenty thouſand planchets in one day. Gold, ſilver, and copper planchets are all of them coined with a mill, to which the coining ſquares, (*fig.* 16.) commonly called dyes, are faſtened; that of the face under, in a ſquare box furniſhed with male and female ſcrews, to fix and keep it ſteady; and the other above, in a little box, furniſhed with the ſame ſcrews, to faſten the coining ſquare. The planchet is laid flat on the ſquare of the effigy, which is dormant; and they immediately pull the bar of the mill by its cords, which cauſes the ſcrew ſet within it to turn. This enters into the female ſcrew, which is on the body of the mill, ſo that the bar cauſes the ſcrew to turn with ſo much ſtrength, that, by puſhing the upper ſquare upon that of the effigy, the planchet violently preſſed between both ſquares, receives the impreſſion of both at one pull, and in the twinkling of an eye. The planchet, thus ſtamped and coined, goes through a final examination of the mint-wardens, from whoſe hands it goes into the world.

In the Coinage *of Medals*, the proceſs is the ſame, in effect, with that of money; the principal difference conſiſting in this, that money, having but a ſmall relievo, receives its impreſſion at a ſingle ſtroke of the engine; whereas for medals, the height of their relievo makes it neceſſary that the ſtroke be repeated ſeveral times: to this end the piece is taken out from between the dyes, heated, and returned again; which proceſs in medallions and large medals, is repeated fifteen or twenty times before the full impreſſion be given: care muſt be taken that every time the planchet is removed, to take off the ſuperfluous metal, ſtretched beyond the circumference, with a file. Medallions, and medals of a high relievo, are uſually firſt caſt in ſand, by reaſon of the difficulty of ſtamping them in the preſs, where they are put only to perfect them; in regard the ſand does not leave them clear, ſmooth, and accurate enough. Therefore we may ſee that medals receive their form and impreſſion by degrees, whereas money receives them all at once.

Britiſh Coinage, both by the beauty of the engraving, and by the invention of the impreſſions on the edges, that admirable expedient for preventing the alteration of the pieces, is carried to the utmoſt perfection.

It was only in the reign of king William III. that the hammer-money ceaſed to be current in England, where till then it was ſtruck in that manner, as in other nations. Before the hammer coin was called in, the Engliſh money was in a wretched condition, having been filed and clipped by natives as well as foreigners, inſomuch that it was ſcarce left of half the value: the retrieving this diſtreſſed ſtate of the Engliſh money, is looked upon as one of the glories of king William's reign.

The Britiſh coinage is now wholly performed in the Tower of London, where there is a corporation for it, under the title of the mint. Formerly there were here, as there are ſtill in other countries, the rights of ſeinorage and braſſage; but ſince the eighteenth year of king Charles the Second, there is nothing taken either for the king, or for the expences of coining; ſo that weight is returned for weight, to any perſon who carries their gold and ſilver to the Tower.

The ſpecie coined in Great Britain, are eſteemed contraband goods, and not to be exported. All foreign ſpecie are allowed to be ſent out of the realm, as well as gold and ſilver in bars, ingots, duſt, &c.

There is a duty of ten ſhillings per ton on wine, beer, and brandy imported, called the coinage-duty, granted for the expence of the king's coinage.

Barbary Coinage, particularly that of Fez and Tunis, is under no proper regulations, as every goldſmith, Jew, or even private perſon, undertakes it at pleaſure; which practice renders their money exceeding bad, and their commerce very unſafe.

Muſcovite Coinage. In Muſcovy there is no other coin ſtruck but ſilver, and that only in the cities of Moſcow, Novogrod, Twere, and Pleſkow, to which may be added Peterſbourg, the favourite city of her Czarian majeſty. The coinage of each of theſe cities is let out to farm, and makes part of the royal revenue.

Perſian Coinage. All the money made in Perſia is ſtruck with a hammer, as is that of the reſt of Aſia; and the ſame may be underſtood of America, and the coaſts of Africa, and even Muſcovy: the king's duty, in Perſia, is ſeven and a half per cent. for all the monies coined, which are lately reduced to ſilver and copper, there being no gold coin there, except a kind of medals, at the acceſſion of a new ſophi.

Spaniſh Coinage is eſteemed one of the leaſt perfect in Europe. It is ſettled at Seville and Segovia, the only cities where gold and ſilver are ſtruck; and yet there is ſcarcely any ſtate in the world where ſo much money is coined in, as in that of the king of Spain.

The invention of the preſs is not yet gone out of Europe; nor even eſtabliſhed in every part of it: nor was the invention known till the year 1553, when the coining-preſs was invented by an engraver, one Antoine Brucher, and was firſt tried in the French king's palace at Paris, for the coining of counters: ſome attribute the invention of the preſs to Varin, a noted engraver, who in reality was no more than an improver of it; and others aſcribe it to Aubry Olivier, who had the inſpection of it.

This machine has met with various fates ſince its firſt invention, being one time uſed, and at another time laid aſide, and the hammer reſumed; but it has now got ſuch a footing and reputation, both for its expedition and the beauty of its impreſſion on the ſpecie ſtruck with it, that there appears no great probability of its ever being again diſuſed.

Coining, in the tin-works, is the weighing and ſtamping the blocks of tin with a lion rampant, performed by the king's officer; the duty for every hundred weight being four ſhillings.

COITION, the intercourſe between the male and the female in the act of generation.

COLARBASIANS, in church hiſtory, Chriſtian heretics, in the ſecond century, who maintained the whole plenitude and perfection of truth and religion to be contained in the Greek alphabet; and that it was upon this account that Jeſus Chriſt was called the Alpha and Omega: they rejected the Old Teſtament, and received only a part of St. Luke's Goſpel, and ten of St. Paul's Epiſtles, in the New.

COLARIN, in architecture, the little frize of the capital of the Tuſcan and Doric column, placed between the aſtragal and the annulets; called alſo hypotrachelium, and ſometimes cincture.

Colarin is alſo uſed for the orlo or ring on the top of the ſhaft of the column, near the capital.

COLCHICUM, meadow ſaffron, in botany, a genus of plants, with a monopetalous flower, divided into ſix oblong and erect ſegments: the fruit is a trilocular capſule, formed of three lobes, and containing a conſiderable number of roundiſh and rugoſe ſeeds.

The roots of this plant, once eſteemed poiſonous, are recommended by ſome in peſtilential and putrid caſes, the ſmall-pox, purple fever, &c. But great caution ought to be uſed in adminiſtering it.

COLCOTHAR, in pharmacy, a preparation of vitriol calcined to a redneſs.

COLD, in general, denotes the privation or abſence of heat; and, conſequently, thoſe who ſuppoſe heat to conſiſt in a briſk agitation of the component particles of the hot body, define cold to be ſuch a faint motion of theſe parts, as is either altogether or nearly imperceptible to our organs of feeling: in which ſenſe, cold is a mere term of relation between the cold body and the organs of ſenſation; and, in fact, the ſame body will be felt either hot or cold, according as the ſenſible organ is colder or hotter than it.

Be this as it will, cold is found to have very conſiderable effects, and therefore ſhould ſeem to be ſomething poſitive. An intenſe degree of heat reduces moſt bodies, even gold and the hardeſt ſtones, the diamond excepted, to a fluid ſtate. On the other hand, not only are theſe reſtored to their former ſolidity by cold, but greater degrees of it will congeal all kinds of water, even that of the ocean, and the watery particles to be found in ſpirits. See the articles Frost, Condensation, &c.

Artificial Cold, that produced by the help of freezing mixtures. See Freezing *Mixtures*.

There happened at Peterſburg, on the 14th of December, 1759, a very great froſt, equal, if not more intenſe, than any which had been obſerved there: for, between nine and ten o'clock in the morning, De Liſle's thermometer ſtood at 205; at eleven o'clock, at 201; which laſt was the greateſt degree of cold that had been obſerved at Peterſburg, either by himſelf or others. At one o'clock at noon, the thermometer ſtood at 197. Mr. Braun had been employed, ſeveral days before this, in obſerving the ſeveral degrees of cold which different fluids would bear, before they were converted into ice; partly to confirm thoſe things which he had already laid before the academy, and partly to make experiments upon liquors, which had not yet been examined; as on the days between the 7th and 14th the cold was intenſe enough to be between the degrees of 181 and 191.

When the natural cold was ſo intenſe as to be at 205, Profeſſor Braun conjectured, that it was of all others the moſt proper occaſion to try the effects of artificial cold, not doubting but that artificial cold would be increaſed in proportion as the natural was more intenſe. Aqua-fortis, which was found by the thermometer to be 204 degrees cold, was the greater part of it frozen, the ice having the appearance of cryſtals of nitre; which, however, immediately diſſolved in a ſmall degree of heat. This aqua-fortis, which, though frozen at the ſides, was liquid in the middle, was poured upon pounded ice, in that proportion which was directed by Fahrenheit, the firſt perſon who made artificial cold with ſpirit of nitre. But before the profeſſor made this experiment, he, by examination, found, that both the ice and aqua-fortis were of the temperature with the air, which was then 204. Upon the firſt pouring, the mercury fell 20 degrees: this ſpirit was poured off, and freſh put on, ſeveral times; but it was poſſible, by theſe means, to introduce no more than 30 degrees of cold; ſo that the mercury in the thermometer fell no lower than 234. Since therefore Fahrenheit could not produce cold greater than that of 40 below the cypher of his thermometer, which correſponds with 210 of that employed by profeſſor Braun; nor Reaumur, nor Muſchenbroek, who often repeated the ſame experiment, our author was upon the point of giving up this purſuit, as conſidering this as the greateſt degree to which artificial cold could be carried, thinking it ſufficient honour to himſelf to have added 20 degrees to the cold formerly known.

But reflecting that this was not all the fruit he expected from theſe experiments, he determined to purſue them; but at the ſame time, however, to vary the manner of them. By good fortune, his ice was all gone, and he was compelled to uſe ſnow in its ſtead, after having firſt tried and found the ſnow of the ſame degree of cold with the air, at this time 203. The ſnow, the thermometer, and the aqua-fortis, being of the ſame temperature, he immerſed the thermometer in ſnow contained in a glaſs; and at firſt only poured a few drops of the aqua-fortis upon that part of the ſnow in which the thermometer was immerſed; upon which he obſerved the mercury to ſubſide to 260. Elated by this remarkable ſucceſs, he immediately conceived hopes that theſe experiments might be carried further: nor was he deceived in his expectations; for repeating the experiment in the ſame ſimple manner, he poured on only ſome more aqua-fortis, and immediately the mercury fell to 380. Upon which he immerſed the thermometer in another glaſs filled with ſnow, before it had loſt any of this acquired cold; and at length, by this third experiment, the mercury ſubſided to 470 degrees. When he obſerved this enormous degree of cold, he could ſcarce give credit to his eyes, and believed his thermometer broke. But to his infinite ſatisfaction, upon taking out his thermometer, he found it whole; tho' the mercury was immoveable, and continued ſo in the open air twelve minutes. He carried his thermometer into a chamber, where the temperature of the air was 125 degrees; and after ſome minutes, the mercury being reſtored to its fluidity, began to riſe. But to be certain whether his thermometer had received any injury, and whether it would yet correſpond with his thermometer, which he keeps as a ſtandard, he ſuſpended them together, and in 20 minutes the thermometers correſponded one with the other.

The thermometers which our author uſually employs have a ſpherical bulb, and their ſcale is divided into 1200 parts, of which 600 are above the cypher, which denotes the heat of boiling water, and 600 below that heat. A thermometer of this conſtruction was uſed in inveſtigating the heat of boiling mercury and oils. He had another thermometer, of which the ſcale went no lower than 360 degrees below the cypher denoting the heat of boiling water. He repeated the former experiment with this, and the mercury very ſoon deſcended ſo that the whole was contained in the bulb, which however it did not quite fill. The mercury in this bulb was immoveable, even though he ſhook the thermometer; until about a quarter of an hour it began to aſcend in the open air; and it continued to aſcend, till it became higher than the circumambient air ſeemed to indicate. He was ſtruck with this extraordinary phænomenon, and very attentively looked at the mercury in this thermometer, and found certain air bubbles interſperſed with the mercury, which were not in that of the other thermometer. From theſe, and other experiments (it would be unneceſſary to recite them all) he was ſatisfied, that the mercury in theſe thermometers had been fixed and congealed by the cold.

Hitherto our profeſſor had only ſeen the mercury fixed within the bulb of his thermometers. Theſe he was unwilling to break. He was, however, deſirous of examining the mercury in its fixed ſtate, and therefore determined to break his thermometers in the next experiments. It was ſeveral days before he got other thermometers which exactly correſponded with thoſe he had already employed.

When theſe were procured, the natural cold had ſomewhat relented. In the former experiment, the thermometer ſtood at 204; it was now at 199. In making the experiment, he varied the manner a little. He firſt put the bulb of the thermometer into a glaſs of ſnow, gently preſſed down, before he poured on the aqua-fortis; he then, in another glaſs, poured the aqua-fortis upon the ſnow, before he immerſed his thermometer therein; he then, in like manner, put the ſnow to the aqua-fortis, before he put his thermometer therein. Which ever of theſe ways he proceeded, he found the event exactly the ſame; as the whole depended upon the aqua-fortis diſſolving the ſnow. When he had proceeded ſo far as to find the mercury immoveable, he broke the bulb of the thermometer, which had already been cracked in the experiment, but the parts were not ſeparated. He found the mercury ſolid, but not wholly ſo, as the middle part of the ſphere was not yet fixed. The external convex ſurface of the mercury was perfectly ſmooth; but the internal concave one, after the ſmall portion of mercury, which remained fluid, was poured out, appeared rough and uneven, as though compoſed of ſmall globules. He gave the mercury ſeveral ſtrokes with the peſtle of a mortar, which ſtood near him. It had ſolidity enough to bear extenſion with theſe ſtrokes; its hardneſs was like that of lead, though ſomewhat ſofter; and, upon ſtriking, it ſounded like lead. When the mercury was extended by theſe ſtrokes, he cut it eaſily with a penknife. The mercury then becoming ſofter by degrees, in about twelve minutes it recovered its former fluidity, the air being then 197. The colour of the congealed mercury did ſcarce differ from that of the fluid; it looked like the moſt poliſhed ſilver, as well in its convex part, as where it was cut.

The next day, the cold had increaſed to 212 degrees, which was 7 degrees beyond what it had ever before been obſerved at Peterſburg. The ſeaſon ſo much favouring, he thought it right to continue his purſuit, not only in further confirmation of what he had already obſerved, but to inveſtigate new phænomena. In two thermometers, he obſerved the ſame facts in relation to the congealing of mercury as he did the preceding day. In the bulbs which he broke the whole of the mercury was not fixed, as a very ſmall portion, much leſs than that of the preceding day, continued fluid. He treated this mercury as he did the former; he beat it with a peſtle, he cut it, and every thing was thus far the ſame. But he ſaw a very great difference in relation to the deſcending of the mercury in the thermometer, the like of which did not occur to him, neither in the former, nor any of the ſubſequent experiments. From the former ones it appeared that the mercury in the firſt experiment had only deſcended to 470, when it became immoveable, though the glaſs bulb was not cracked. In the experiment of the 25th, it deſcended to 530; and in two thermometers on the 26th, to 650. But as well in the thermometer, which he uſed on the 25th, as in two of the 26th, the bulbs were cracked in the experiment: they cohered however; nor was the leaſt part of the bulb ſeparated, but the congealed mercury ſeemed to adhere to all parts of the bulb. In the following experiments he invariably found, that the mercury ſunk lower, if the whole of it was congealed, than if any part of it remained fluid. It then generally deſcended to 680 and 700, but the bulbs were never without cracks; moreover it deſcended to 800, and beyond even to 1500; but in this laſt experiment, the bulb was quite broke, ſo that the globe of mercury, thoroughly frozen, fell out, and by its fall, of about 3 feet, the globe of mercury became a little compreſſed; but in the former, only ſome parts of the bulb fell off.

Mr. Braun always found that, *cæteris paribus*, the more intenſe the natural cold was, the more eaſy and more expeditiouſly theſe experiments did ſucceed.

In continuing theſe experiments he obſerved, that double aqua-fortis was more effectual than ſimple ſpirit of nitre; but that if both the aqua-fortis and Glauber's ſpirit of nitre, which he ſometimes alſo uſed, were well prepared, the difference was not very conſiderable. When his aqua-fortis was frozen, which often happened, he found the ſame effects from the frozen parts, when thawed, as from that part of it which remained fluid in the middle of the bottle. Simple ſpirit of nitre, though it ſeldom brought the mercury lower than 300 degrees, by the following method he even froze mercury with it. He filled ſix glaſſes with ſnow, as uſual, and put the thermometer in one of them, pouring thereupon the ſpirit of nitre. When the mercury would fall no lower in this, he, in the ſame manner, put in a ſecond, then in a third, and ſo in a fourth; in which fourth immerſion the mercury was congealed.

Another very conſiderable difference preſented itſelf in purſuing theſe inquiries, with regard to the mode of deſcent of the mercury. He conſtantly and invariably obſerved, that the mercury deſcended at firſt gently, but afterwards very rapidly. But the point at which this impetus begins is not eaſy to aſcertain, as in different experiments it begins very differently, and ſometimes at about 300, at other times about 350, and even further. In the experiment before-mentioned, in which the mercury fell to 800, it proceeded very regularly to 600; about which point it began to deſcend with very great ſwiftneſs, and the bulb of the thermometer was broke. The mercury, however, was perfectly congealed.

He frequently obſerved another remarkable phænomenon, which was, that although the ſpirit of nitre, the ſnow, and the mercury in the thermometer, were previouſly reduced to the ſame temperature, upon pouring the ſpirit of nitre upon the ſnow, the mercury in the thermometer roſe. But as this did not always happen, he carefully attended to every circumſtance; from which it appeared, that this effect aroſe from his pouring the aqua-fortis immediately upon the bulb of the thermometer, not previouſly well immerſed in the ſnow. He likewiſe obſerved another effect, twice only; and this was, that, after the thermometer had been taken out of the ſnow and aqua-fortis, the mercury continued to ſubſide, in the open air, down as low as the congelation of mercury.

In the courſe of theſe enquiries, our profeſſor found no difference whether he made uſe of long or ſhort thermometers; whether the tubes were made of the Bohemian, or the glaſs of Peterſburg. Under the ſame circumſtances, the ſame effects were alſo produced, making an allowance for the different contraction of the different glaſſes, under ſo ſevere a degree of cold. But if theſe tubes were filled with different mercury, there was then a ſenſible difference; inaſmuch as mercury revived from ſublimate did not ſubſide ſo faſt in the thermometer, as that did which was leſs pure. He has even found, that he has been able to congeal the leſs pure mercury, at a time when he could not bring the revived mercury lower than 300 degrees: but this he would, till farther trials have been made, not have conſidered as a general axiom.

From theſe experiments our author conceives it demonſtrated, that heat alone is the cauſe of the fluidity of mercury, as it is that of water and other fluids. If therefore any part of the world does exiſt, in which ſo great a degree of cold prevails as to make mercury ſolid, there is no doubt but that mercury ought to appear there as a body equally firm and conſiſtent, as the reſt of the metals do here: that mercury, upon congealing, becomes its own ice, however different the mercurial ice may be from that of water, or other liquids. The idea of freezing does or can comprehend nothing more than a tranſition of bodies from a ſtate of fluidity to that of firmneſs, by the ſole interpoſition of cold.

The ice of oily and ſaline bodies differs greatly from that of water, which is friable and eaſily broke, whereas that of mercury is ductile. And M. Braun proceeds to conſider all bodies, which liquefy by heat, as ſo many ſpecies of ice; ſo that every metal, wax, tallow, and glaſs, comes within his view in this reſpect. Mercury then is, in its natural ſtate, a ſolid metal, but is fuſible in a very ſmall degree of heat.

COLD, in medicine, is found to be productive of inflammatory diſorders, as coughs, pleuriſies, peripneumonies, rheumatic pains, conſumptions, &c. See the articles COUGH, PLEURISY, PERIPNEUMONY, &c.

To remove a cold in the beginning, ſmall and repeated bleedings are recommended; which likewiſe prove beneficial in coughs and the confirmed conſumption, even after a purulent ſpitting and hectical ſymptoms have appeared. The quantity to be taken away at a time, may be from four to ſeven or eight ounces, once in eight or ten days; concerning which it is obſervable, that the patients do not find themſelves ſo much relieved on the firſt as on the ſecond or third night after bleeding.

COLDSHIRE-IRON, that which is brittle when cold. See the article IRON.

COLEOPTERA, among zoologiſts, an order of inſects, comprehending all thoſe with four wings, the external pair of which are hard, rigid, and opaque, and form a kind of caſe for the interior pair: add to this, that the mouth conſiſts of two tranſverſe jaws.

COLE-SEED, the ſeed of the *napus ſativa*, or long-rooted, narrow-leaved, navea, and comprehended by Linnæus among the braſſicas, or cabbage kind. See BRASSICA.

This plant is cultivated to great advantage in many parts of England, on account of the nape-oil expreſſed from its ſeeds. It requires a rich and ſtrong ſoil, eſpecially in marſh or fenny lands, thoſe newly recovered from the ſea, or indeed any other land that is rank or fat, whether arable or paſture. The beſt ſeeds are brought from Holland, and ſhould be ſown about Midſummer, the very day that the land is ploughed: a gallon will ſerve an acre.

Beſides the oil already mentioned, it is likewiſe cultivated for winter-food to cattle, and is a very good preparative of land for barley or wheat.

COLE-WORT, in gardening, a ſpecies of braſſica. See BRASSICA.

COLIC, in medicine, a ſevere pain in the lower venter, ſo called, becauſe the diſorder was formerly ſuppoſed to be ſeated in the colon.

As the ſmall and great inteſtines differ with reſpect to their contexture, capacity, function, and ſituation, ſo the pains which affect them are no leſs diſtinguiſhed by the places where they are ſeated, their degree of violence, their danger, and other acceding diſorders. It is obſerved, that pains in the ſmall inteſtines, are far more ſevere and acute than in the great ones. This is abundantly evident from the effects of ſtrong cathartics, and poiſons of a cauſtic quality, in exciting moſt ſevere griping and racking pains, above and below the navel, as well as in the middle of the belly.

Moſt phyſicians take the whole regions of the inteſtines for the ſeat and ſubject of this pain; yet ſo, as that when one part of it is affected in an extraordinary manner, the whole inteſtinal tube, from the fauces to the anus, ſuffers by conſent; or the preternatural motions, and even the inverſions and injuries of the periſtaltic motion, are communicated to all the reſt in ſuch a manner, that if the cauſe of the diſeaſe be very conſiderable, the whole nervous ſyſtem is at the ſame time affected to an extraordinary degree.

There are different cauſes of theſe ſevere pains of the inteſtines, and according to the nature, diſpoſition, and force of theſe cauſes, are the ſymptoms diverſified, and the danger more or leſs to be apprehended. A very frequent cauſe is a retention and induration of the fœces in the large inteſtines, and ſometimes in the ſmall ones, proceeding, in a great meaſure, from a load of acido-viſcid crudities, dry, juiceleſs, and aſtringent food, immoderate ſleep, and a way of life unuſed to exerciſe and motion. In this obſtructed and coſtive ſtate of the belly, whenever it happens, that upon the uſe of ſweet aliments, and ſuch as are ſubject to ferment, of fat fleſh meat, eſpecially mutton, with drinking of cool liquors, and refrigeration of the feet and belly, the inflation of the abdomen is increaſed, and the pain exaſperated: hence we may diſcern the nature and marks of the flatulent colic, which the ancients aſcribed to a cold cauſe, and whoſe generation and frequent attacks ſuppoſe an imbecility of the inteſtines, and a want of a due tone and ſtrength in thoſe parts; whence this ſort of cholic is very incident to fat and phlegmatic, as well as old and infirm perſons, eſpecially if they take not due care to keep the cold from their feet, back, and belly.

Another kind of colic is the bilious, which, according to the ancients, owes its original to a hot cauſe, and ariſes from a bilious, acrid, corrupted humour, collected in too great plenty, and ſtagnating in the ſmall inteſtines, particularly the duodenum. It frequently ſucceeds a great fit of anger, eſpecially in perſons of a hot and dry conſtitution, in a hot ſeaſon; or it proceeds from an exceſſive uſe of hot and ſpirituous liquors, and by cooling potions, which obſtruct perſpiration, is exaſperated, and rages with greater violence. The remarkable ſymptoms which attend it, are a hoarſeneſs of the voice, the heart-burn, a continual loathing of food, a vomiting of porraceous bilious matter, the hiccup, a hot and feveriſh diſtemperature, reſtleſſneſs, &c.

As to the method of cure, it appears from what has been ſaid, that the cauſes of this affection are ſurpriſingly various; and it may be inferred, that the manner of treatment ought to be varied in a way ſuitable to the difference of the cauſes, whence the pain of the inteſtines proceeds.

When from a ſuppreſſion of the cuſtomary flux of the hæmorrhoids, or menſes, eſpecially in bodies abounding with blood, there ariſes a violent pain of the abdomen, attended with much heat, &c. a vein ſhould be opened in the foot, then emollient clyſters, antiſpaſmodic powders, with a ſmall portion of nitre, cinnabar, and caſtor, ſhould be uſed, and the feet bathed; and under a remiſſion of the fit, care ſhould be taken to reſtore the menſes in women, and the hæmorrhoids in men, to their natural courſes. When the pain of the inteſtines proceeds from a redundance of intemperate and cauſtic bile, the ſame remedies are of ſervice.

But what exceeds theſe and all other remedies in this caſe, is a nitrous powder, mixed with a drop or two of the true diſtilled oil of millefolium, to be taken in three or four ounces of the water of common chamomile-flowers.

If the pain be tenſive, and fixed in the right or left hypochondrium, or beneath the ſtomach, it is a ſure ſign that the diſorder proceeds from flatulencies, or excrements incloſed within the flexures of the colon. In this caſe, the principal indication directs us to the uſe of clyſters of an emollient, diſcutient, and corroborating quality, not omitting external applications of carminative and emollient liniments to the affected part.

When the rectum and part of the colon are affected with a ſtrong convulſive ſtricture, ſo as to be incapable of tranſmitting either flatus or fæces; and a clyſter cannot conveniently be introduced, the abdomen is to be fomented all over with hot and rich oils, by coction, particularly thoſe of chamomile, dill, or rue, boiled with the fats of a badger, dog, fox, beaver, &c. which may be introduced, if poſſible, into the belly by clyſters.

A flatulent colic, proceeding from imbecility, and want of a due tone of the ſtomach and inteſtines, admits of the uſe of carminative things ſomewhat hotter than ordinary. Among theſe are ſpirituous carminative waters, prepared of the ſeeds of cumin and caraway, orange-peel, and the flowers of common Roman chamomile, and cardamums, diſtilled in wine.

COLISEUM, or COLISÆUM, in ancient architecture, an oval amphitheatre at Rome, built by Veſpaſian, wherein were ſtatues ſet up repreſenting all the provinces of the empire; in the middle whereof ſtood that of Rome, holding a golden apple in her hand. This ſtructure was ſo large, that it would hold near one hundred thouſand ſpectators.

COLLAR, in a modern ſenſe, an ornament conſiſting of a chain of gold, enamelled, frequently ſet with cyphers or other devices, with the badge of the order hanging at the bottom, wore by the knights of ſeveral military orders over their ſhoulders, on the mantle, and its figure drawn round their armories.

Knights of the COLLAR, a military order in the republic of Venice, called alſo the order of St. Mark, or the medal.

COLLAR *of a Plough*, an iron ring fixed on the middle of the beam, wherein are inſerted the tow and bridle chains. See the article PLOUGH.

COLLAR *of a Draught Horſe*, a part of harneſs made of leather and canvas, and ſtuffed with ſtraw or wool, to be put about the horſe's neck.

COLLATERAL POINT, in coſmography, the intermediate points of thoſe between the cardinal points.

COLLATERAL, in genealogy, thoſe relations which proceed from the ſame ſtock, but not in the ſame line of aſcendants or deſcendants, but being, as it were, aſide of each other.

COLLATION, in the canon law, the giving or beſtowing of a benefice on a clergyman by a biſhop, who has it in his own gift or patronage.

This differs from preſentation, in that the latter is properly the act of a patron, offering the clerk to the biſhop to be inſtituted into a benefice, whereas the former is the act of the biſhop himſelf. The collator can never confer a benefice on himſelf.

COLLATIVE BENEFICES are thoſe which are in the gift of the ordinaries, and within their own juriſdiction, in which caſe there need no preſentation, but the ordinary collates or inſtitutes the clerk, and ſends him to the archdeacon, or other perſon, whoſe office it is to induct him.

COLLECTION, in logic, a term uſed by ſome for what is generally called ſyllogiſm. See the article SYLLOGISM.

COLLECTIVE, among grammarians, a term applied to a noun expreſſing a multitude, though itſelf be only ſingular; as an army, company, troop, &c. called collective nouns.

COLLEGATARY, in the civil law, a perſon who has a legacy left him in common with one or more other perſons.

COLLEGE, *Collegium*, an aſſemblage of ſeveral bodies or ſocieties, or of ſeveral perſons into one ſociety.

COLLEGE *of Civilians*, commonly called Doctors-Commons, founded by Dr. Harvey, dean of the arches, for the profeſſors of the civil law reſiding in the city of London. The judges of the arches, admiralty and prerogative court, with ſeveral other eminent civilians, commonly reſide here.

COLLEGE *of Phyſicians*, a corporation of phyſicians in London, whoſe number, by charter, is not to exceed eighty. The chief of them are called fellows, and the next candidates, who fill up the places of fellows as they become vacant by death, or otherwiſe. Next to theſe are the honorary fellows, and laſtly, the licentiates; that is, ſuch as being found capable, upon examination, are allowed to practiſe phyſic.

Sion COLLEGE, or the college of the London clergy, was formerly a religious houſe, next to a ſpittal, or hoſpital, and now it is a compoſition of both, viz. a college for the clergy of London, who were incorporated in 1631, at the requeſt of Dr. White, under the name of the preſident and fellows of Sion college; and an hoſpital for ten poor men, the firſt within the gates of the houſe, and the latter without.

Greſham COLLEGE, or COLLEGE *of Philoſophy*, a college founded by Sir Thomas Greſham, who built the Royal Exchange; a moiety of the revenue whereof he gave in truſt to the mayor and commonalty of London, and their ſucceſſors for ever; and the other moiety to the company of mercers; the firſt to find four able perſons to read in the college divinity, aſtronomy, muſic, and geometry; and the laſt, three or more able men to read rhetoric, civil law, and phyſic; a lecture upon each ſubject is to be read in term time, every day, except Sundays, There are two kinds of theſe collegiate churches, ſome of royal foundation, others of eccleſiaſtical foundation: each of them, in matters of divine ſervice, are regarded in the ſame manner as cathedrals.

[illegible] collegiate churches which have epiſcopal rights; ſome of theſe churches were anciently abbies, which in time were ſecularized.

COLLET, among jewellers, denotes the horizontal face or plane at the bottom of brilliants.

Collet, in glaſs-making, is that part of glaſs veſſels which ſticks to the iron inſtrument wherewith the metal was taken out of the melting-pot: theſe are afterwards uſed for making green glaſs.

COLLIFLOWER, or Cauliflower. See the article Cauliflower.

COLLIQUAMENTUM, in natural hiſtory, an extreme tranſparent fluid in an egg, obſervable after two or three days incubation, containing the firſt rudiments of the chick. It is included in one of its own proper membranes, diſtinct from the albumen. Harvey calls it the occulus.

COLLIQUATION, in phyſic, a term applied to the blood, when it loſes its craſis or balſamic texture; and to the ſolid parts, when they waſte away by means of the animal fluids flowing off through the ſeveral glands, and particularly thoſe of the ſkin, faſter than they ought; which occaſions fluxes of many kinds, but moſtly profuſe, greaſy, and clammy ſweats.

COLLIQUATIVE Fever, in phyſic, a fever attended with a diarrhœa, or profuſe ſweats, proceeding from colliquation.

COLLISION, the ſtriking of one hard body againſt another, or the friction or percuſſion of bodies moving violently with different directions, and daſhing againſt each other. See Percussion.

COLLUSION, in law, a ſecret underſtanding be-

ſmall inteſtines, and is uſually convoluted and flexuous, variouſly, in a ſtrange manner. Its beginning is above the termination of the ilium, and its end at the os ſacrum. It is connected with the os ilii, the right kidney, the gall bladder, the liver, the ſtomach, the ſpleen, and finally with the left kidney. Its length is from five to ſeven ſpans; its diameter is the greateſt of that of any inteſtine. It has three ligaments terminating in the vermiform proceſs that runs longitudinally in it. It has alſo certain external adipoſe appendiculæ, which ſerve to lubricate it. The connivent valves are larger in this than in any other of the guts, and the coats it is compoſed of are ſtronger than in the ſmall guts.

Colon, in grammar, a point or character marked thus (:) ſhewing the preceding ſentence to be perfect or entire; only that ſome remark, farther illuſtration, or other matter connected therewith, is ſubjoined.

According to a late ingenious author, the colon differs from the ſemicolon, &c. in ſerving to diſtinguiſh thoſe conjunct members of a ſentence which are capable of being divided into other members; whereof one at leaſt is conjunct.

COLONEL, in military matters, the commander in chief of a regiment, whether horſe, foot, or dragoons.

COLONEL-LIEUTENANT, he who commands a regiment of guards, whereof the king, prince, or other perſon of the firſt eminence, is colonel.

Lieutenant Colonel, the ſecond officer in a regiment, who is at the head of the captains, and commands in the abſence of the colonel.

COLONNADE, in architecture, a periſtyle of a circular figure; or a ſeries of columns diſpoſed in a circle, and inſulated within ſide.

A polyſtile Colonnade is that whoſe numbers of columns is too great to be taken in by the eye at a ſingle view. Such is the colonnade of the palace of St. Peter's acid water, which diſcovers the nature and genuine properties of a reſin. Whatever virtues therefore colophony is poſſeſſed of, may be aſcribed to the energy of theſe two principles, combined and blended into one common ſubſtance. Colophony reduced to powder, is of ſingular advantage in ſurgery, in caſes where the bones are laid bare, or the perioſteum, tendons, and muſcles, injured by burns, corroſions, contuſions, punctures, lacerations, or partial diviſions. It alſo prevents defluxions of ſerum on the joints, and induces, cicatrizes, and checks the fungous excreſcences of ulcers, if applied in the ſame manner. Beſides its drying, conſolidating, and lenitive qualities, it is an ingredient in ſeveral plaſters and ointments.

COLOQUINTIDA, COLOCYNTH, *Colocynthis*, in pharmacy, the fruit of the plant colocynthis. See COLOCYNTHIS.

COLOSSUS, a ſtatue of a gigantic, or enormous ſize.

The moſt famous of this kind was the coloſſus of Rhodes, made, in honour of Apollo, by Chares the diſciple of Lyſippus. It was eighty-ſix feet high, and its thumb ſo large, that few people could fathom it. This ſtatue was placed acroſs the mouth of the harbour at Rhodes, and the ſhips with full ſails paſſed betwixt its legs.

COLOUR, in philoſophy, an inherent property in light, exciting different vibrations, according to the different magnitudes of its parts, in the fibres of the optic nerve, which affect the mind with different ſenſations.

The philoſophers, before Sir Iſaac Newton's time, ſuppoſed that all light, in paſſing out of one medium into another of different denſity, was equally refracted in the ſame or like circumſtances; but that illuſtrious and accurate author has diſcovered that it is not ſo, but that "There are different ſpecies of light; and that each ſpecies is diſpoſed both to ſuffer a different degree of refrangibility in paſſing out of one medium into another, and to excite in us the idea of a different colour from the reſt; and that bodies appear of that colour which ariſe from the compoſition of the colours the ſeveral ſpecies they reflect are diſpoſed to excite."

There are abundance of experiments made by Sir Iſaac Newton, and others, for the confirmation of this doctrine; we ſhall only ſelect the following ones, which will ſufficiently illuſtrate the propoſition, and evince the truth of it. And,

Firſt, There are different ſpecies of light, and each ſpecies is diſpoſed to ſuffer a different degree of refrangibility, and to excite the idea of a different colour.

To ſhew this, let a room be darkened, and the ſun permitted to ſhine into it through a ſmall hole in the window-ſhutter, and be made to fall upon a glaſs priſm (by which is meant a piece of glaſs of a triangular form, ſuch as is repreſented in plate XLII. *fig.* 1.) then will the ſun's light in paſſing through this priſm ſuffer different degrees of refraction, and by that means be parted into different rays, which rays, being received upon a clean white paper, will exhibit the following colours, viz. red, orange, yellow, green, blue, indigo, and a violet purple. Thus let A B (plate XLII. *fig.* 2.) repreſent the window-ſhutter, C the hole in it, DEF the priſm, ZY a ray of light coming from the ſun, which paſſes through the hole, and falls upon the priſm at Y; and if the priſm were removed, would go on to X, but in entering its firſt ſurface EF ſhall be refracted into the courſe Y W, falling upon the ſecond in W, where, in going out into the air, it ſhall be refracted again.

Let the light now, after it has paſſed the priſm, be received upon a ſheet of white paper G H I K, held at a proper diſtance, and it will exhibit upon the paper a picture or image at LM, of an oblong figure, whoſe ends are ſemi-circular, and ſides ſtraight. And it ſhall be variegated with colours after the following manner.

From the extremity M, to ſome length, ſuppoſe to the line *n o*, it ſhall be of an intenſe red; from *n o* to *p q* it ſhall be of an orange colour; from *p q* to *r s* it ſhall be yellow; from thence to *t u* it ſhall be green; from thence to *w x* blue; from thence to *y z* indigo; and from thence to the end violet. And if the whole image be divided lengthwiſe into 360 equal parts, the red ſhall take up 45 of them, the orange 27, the yellow 48, the green 60, the blue 60, the indigo 40, and the violet 80.

Sir Iſaac Newton, in his Optics, has ſhewn how, from the refraction of the moſt refrangible and leaſt refrangible rays, to find the refraction of all the immediate ones. His rule is this; if the ſine of incidence be to the ſine of refraction in the leaſt refrangible rays, as AV to BC (*fig.* 3.) and to the ſine of refraction in the moſt refrangible, as A V to BD; and if C E be taken equal to CD, and then E D be ſo divided in F, G, H, I, K, L, that ED, EF, EG, EH, EI, EK, EL, EC, may be proportional to the eight lengths of muſical chords, which ſhall ſound the notes in an octave, E D being the length of the key, E F the length of the tone above that key, EG the length of the leſſer third, E H of the fourth, EI of the fifth, E K of the greater ſixth, E L of the ſeventh, and E C of the octave above that key; that is, if the lines E D, E F, EG, EH, EI, EK, EL, and EC, bear the ſame proportion to each other, as the numbers 1, $\frac{8}{9}$, $\frac{5}{6}$, $\frac{3}{4}$, $\frac{2}{3}$, $\frac{3}{5}$, $\frac{9}{16}$, $\frac{1}{2}$, reſpectively, then ſhall BD and BF be the limits of the ſines of refraction of the violet rays; that is, the violet coloured rays ſhall not all of them preciſely have the ſame ſine of refraction, but none of them ſhall have a greater ſine than B D, nor a leſs than BF, though there be violet-coloured rays which anſwer to any ſine of refraction that can be taken between theſe two. In the ſame manner B F and B G are the limits of the ſines of refraction of the indigo; B G and BH are the limits belonging to the blue; B H and BI the limits pertaining to the green; B I and B K the limits for the yellow; BK and BL the limits for the orange-coloured rays; and, laſtly, B L and BC, thoſe of the ſines of refraction belonging to the red.

And particularly, when light paſſes out of glaſs into air, if the ſine of its angle of incidence be 50, the ſine of the angle of refraction of the red will be between 77 and $77\frac{1}{8}$, of the orange-coloured between $77\frac{1}{8}$ and $77\frac{1}{5}$, of the yellow between $77\frac{1}{5}$ and $77\frac{1}{3}$, of the green between $77\frac{1}{3}$ and $77\frac{1}{2}$, of the blue between $77\frac{1}{2}$ and $77\frac{2}{3}$, of the indigo between $77\frac{2}{3}$, and $77\frac{7}{9}$, and of the violet-coloured rays between $77\frac{7}{9}$ and 78.

To render this proof complete, we muſt now ſhew that theſe diſpoſitions of the rays of light to produce ſome one colour, and ſome another, which manifeſt themſelves after being refracted, are not wrought by any action of the priſm upon them, but are originally inherent in thoſe rays; and that the priſm only affords each ſpecies an occaſion of ſhewing its diſtinct quality, by ſeparating them one from the other, which before, while they were blended together in the unrefracted light of the ſun, lay concealed.

This will be proved by the following experiment. Things remaining as in the foregoing one, let another priſm, as N O, (plate XLII. *fig.* 4.) be placed either cloſe to, or at ſome diſtance from, the firſt, in a perpendicular ſituation, with reſpect to the former, ſo that it may refract the rays iſſuing from the firſt, ſideways. Now, if this priſm could ſeparate the light which falls upon it into coloured rays, as the other did, it would divide the image breadthwiſe into colours, as before it was divided lengthwiſe; but no ſuch thing is obſervable; for the image ſhould only be thrown out of the perpendicular ſituation L M into the oblique one P Q; the upper parts, which were more refracted in the former caſe, being more refracted in this; and therefore made to reſide farther ſidewiſe from their former ſituation L, than the lower ones are from M. And farther, each colour ſhall be uniform from ſide to ſide in the oblique image, as well as the perpendicular one.

If there be any objection againſt the ſufficiency of this proof, it muſt be that the rays, when they fall upon the ſecond priſm, are not all in like circumſtances with regard to their inclination to its ſurface; we ſhall therefore, to obviate that objection, add one more experiment, which ſeems to be peculiarly adapted to that purpoſe. It is as follows:

Two boards A B, C D, (plate XLII. *fig.* 5.) being erected in a darkened room at a proper diſtance, one of them AB being near the window-ſhutter EF, a ſpace being only left for the priſm G H I to be placed between them; ſo that part of the rays, which enters the hole M, may, after paſſing through the priſm, be tranſmitted through a ſmaller hole K, made in the board A B, and paſſing on from thence to go out at another hole L, made in the board C D, of the ſame ſize as the hole K, and ſmall enough to tranſmit the rays of one colour only at a time. Let another priſm P Q R be placed behind the board C D to receive the rays paſſing through the holes K and L, and after refraction by that priſm, let the rays fall upon the white ſurface S T. Suppoſe firſt the violet light to paſs through the holes, and to be refracted by the priſm P Q R to *s*, which, if that priſm were not there, would have paſſed on to W. If the priſm G H I be turned about ſlowly, ſo that the incident ray Z Y may fall more obliquely upon it, while the boards and the other priſm remain fixed, in a little time another colour, ſuppoſe indigo, which we may ſuppoſe before to have proceeded to *i*, will paſs through the holes K and L; and if the priſm P Q R were removed, would proceed like the former rays to the ſame point W. Now the refraction of this priſm will not carry theſe rays to *s* as it did the other, but to ſome place leſs diſtant from W, as to *t*. But it is manifeſt, that the holes K and L being in the ſame ſituation in each caſe, both ſorts of rays enter the priſm P Q R under the ſame circumſtances, for they are equally inclined to its ſurface R P, and enter it at the ſame point thereof; which ſhews that the one ſpecies is more diverted out of its courſe by refraction, than the other is, when the circumſtances of incidence are the ſame in each. Farther, if the priſm G H I be turned about till the rays which exhibit blue, paſs through the hole L, theſe will fall upon the ſurface S T below *t*, as at *u*, and therefore are ſubject to a leſs degree of refraction than ſuch as produce indigo. And thus by proceeding it will be found that the green is leſs refracted than the blue, and ſo of the remaining colours, according to the order in which they are repreſented in an image formed by a ſingle priſm. And alſo each ſpecies of rays is diſpoſed to excite in us the idea of a different colour.

This is ſufficiently clear from what has been already ſaid, and is farther confirmed by what follows, viz. that whatever ſpecies of rays are thrown upon any body, they make that body appear of their own colour. Thus minium in red-light appears of its own colour; but in yellow-light it appears yellow; and in green-light, green; in blue, blue; and in violet-purple-coloured light it appears of a purple colour: in like manner verdigriſe will put on the appearance of that colour in which it is placed. But each of theſe bodies appears moſt luminous and bright when enlightened with its own colour, and dimmeſt in ſuch as are moſt remote from that.

It is certain therefore each ray is diſpoſed to excite its own colour, which is neither to be altered by refraction nor reflection. Thus much in confirmation of the firſt part of the propoſition, viz. that there are different ſpecies of light, and that each ſpecies is diſpoſed to ſuffer a different degree of refrangibility, and to excite in us the idea of a different colour. We proceed now to the ſecond part of the propoſition, viz.

2. That bodies appear of that colour which reſults from a compoſition of thoſe colours which the ſeveral ſpecies they reflect are diſpoſed to excite.

We have juſt now ſeen that each ray, whatever be the colour of the body it is reflected from, is able to excite no other idea than that of its own colour; and that coloured bodies reflect not all the different ſorts of rays that fall upon them in equal plenty, but ſome ſorts, viz. thoſe of their own colour, much more copiouſly than others. We will now proceed to ſhew, that the other colours may be produced from a mixture of thoſe ſeven, which rays of light, when ſeparated by a priſm, are diſpoſed to exhibit. From whence it will be rational to conclude, that bodies appear of that colour which ariſes from the mixture of thoſe which they reflect.

1. All the priſmatic colours, viz. thoſe that are made by the priſm, mixed together, appear white, a little inclining to yellow, ſuch as is that of the ſun's light.

To ſhew this, let a convex lens be placed between the priſm and the paper which receives the image, in order that the rays ſeparated by it may be collected into a focus; and let this focus fall upon the paper, then will the ſpot where it falls appear white. And that the whiteneſs of this focal point is owing to the union of thoſe colours appears from hence, that if we remove the paper from the focal point, and ſuffer the rays to croſs each other in the focus, and if, when they have proceeded to ſome diſtance beyond, they be then received upon the paper, the ſame coloured image will be exhibited, and inverted, becauſe the rays croſs each other in the focus; an evident proof that the whiteneſs of the ſpot was owing to nothing but the mixture of the rays conſtituting the ſeveral colours of the image. But if the rays of any particular colour be intercepted before they are collected in the ſaid ſpot, it then appears not only of a different colour from what it did before, but different from any of the priſmatic colours taken ſeparately. Or if the circumference of a wheel be painted with the priſmatic colours taken in the ſame proportion with reſpect to each other, in which they are exhibited in the image made by the priſm, and the wheel be turned ſwiftly about, the circumference of that wheel ſhall appear white: if they are taken in other proportions, the colour of the wheel, when turned about, will vary accordingly. From whence this part of the propoſition is alſo abundantly clear.

No compoſition of theſe colours will produce black; that being no colour but the defect and abſence of all colour whatever. That ſpecies of light which is diſpoſed to ſuffer a greater degree of refraction, requires proportionally leſs obliquity at the ſecond ſurface of any medium to occaſion a total reflection of it there; ſo that it is poſſible that a ray of light may paſs through a medium with ſuch obliquity, that only that part of it which is diſpoſed to exhibit a violet colour ſhall be reflected at the ſecond ſurface, and all the reſt tranſmitted there. This indeed is a neceſſary conſequence of what was obſerved concerning the reflection of light at the ſecond ſurface of any medium, viz. that the reflection of a ray is total, when the obliquity of the incident ray is ſuch, that the angle of refraction ought to be equal to, or exceed a right one. This is a conſequence of that, becauſe the angle of the refraction of the violet-coloured light is larger than the angle of refraction of any other, though their angles of incidence are equal. And accordingly thus it happens, as appears by the following experiment.

Let A B (plate XLII. *fig.* 6.) repreſent the window-ſhutter of a darkened room; C a hole to let in a ray of the ſun; D E F, G H I, two priſms ſo applied together that the ſides E F and G I be contiguous, and the ſides D F and G H parallel: in this ſituation light will paſs through them without any ſeparation into colours; for the oppoſite ſides being parallel, if the rays are refracted one way where they go in, they will be as much refracted the contrary way where they, go out. But if it be afterwards received by a third priſm K L M, it will be divided ſo as to form upon any white body N O Y U the uſual colours, violet at *l*, indigo at *m*, blue at *n*, and red at *r*. Now let it be ſuppoſed that the ſurfaces E F and G I are not quite cloſe together; but that the rays in paſſing from one to the other, paſs through a medium (viz. the air) of different denſity from that of the priſms; and that the ray Z C is not ſo much inclined to the ſecond ſurface of the firſt priſm as to cauſe a total reflection of any one ſpecies there; then will part only of each ſpecies be reflected, and part tranſmitted.

Let now the reflected rays be received by a fourth priſm T X V; theſe, after paſſing through it, will paint upon a white ſurface R S, the colours of the priſm, viz. red at *s*, orange at *t*, yellow at *v*, and violet at *x*. Let now the priſms D E F, G H I, be ſlowly turned about, keeping ſtill the ſame ſituation with reſpect to each other, until the obliquity of the rays Z C to the ſurface E F be ſo far increaſed, that there ſhall begin to be a total reflection of them there. In which caſe it is obſervable, that firſt of all the violet light will be totally reflected, and will therefore diſappear at *l*, appearing inſtead thereof at *x*, and increaſing the violet light which fell there before. And when the rays Z C become more oblique by the priſms being turned farther about, the indigo ſhall be totally reflected, diſappearing at *m*, but falling upon *y*, and making the violet there more intenſe: and by turning the priſms ſtill farther about, all the remaining colours will be ſucceſſively removed from the ſurface P Q to R S.

We are now to enquire what it is that gives bodies this power of reflecting, ſome one ſort of rays moſt copiouſly, and ſome another: and this is probably no other than the different magnitude of the particles whereof they are compoſed, as will appear from the following obſervations.

If water be prepared with ſope ſo as to render it ſufficiently tenacious, and then blown up into a bubble; it is obſervable, that as the bubble grows thinner and thinner, as it will do by reaſon of the water's continually running down from the top of it, till it breaks, different colours will ariſe one after another at the top of the bubble, ſpreading themſelves into rings, and deſcending till they vaniſh at the bottom in the ſame order they aroſe at the top. Thus in an experiment of this kind, tried by Sir Iſaac Newton, the colours aroſe in this order; firſt red, then blue, to which ſucceeded red a ſecond time, and blue immediately followed; after that red a third time, ſucceeded by blue; to which followed a fourth red, but ſucceeded by green; after this a more numerous order of colours, firſt red, then yellow, next green, and after that blue, and at laſt purple; then again red, yellow, green, blue, violet, followed each other; and the laſt order of colours that aroſe was red, yellow, white, blue; to which ſucceeded a dark ſpot that afforded ſcarce any light, though it was obſerved to cauſe ſome very obſcure reflection, for the image of the ſun or candle might be faintly diſcerned in it; and this laſt ſpot ſpread itſelf more and more till the bubble broke.

Now it is apparent that the only reaſon why theſe different colours ſucceeded each other at the top of the bubble, in the above-mentioned manner, was becauſe its thickneſs in that part continually varied, till it broke. It remained therefore to examine what was the thickneſs of the bubble at the top, at the time it exhibited each particular colour: and this was effected by the following contrivance, viz. by taking the object glaſs of a long teleſcope, ſuch having but a very ſmall degree of convexity, and placing it upon a flat glaſs: theſe glaſſes, by reaſon of the convexity of the former, would touch but in one point, and the diſtance between them, where they did not touch, would be exceedingly ſmall, but larger, the farther we conſider it from the point of contact. Now water being put between theſe glaſſes, the ſame colours appeared as in the bubble, in the form of circles or rings ſurrounding the point where the glaſſes touched, which point appeared black like the top of the bubble when it is thinneſt. Next to this ſpot lay a blue circle, and next without that a white one, and ſo on in the ſame but contrary order to that in which the colours aroſe on the top of the bubble.

Now the diſtance between the glaſſes, that is, the thickneſs of the body of water between them, where it exhibited any one colour of a particular order, was equal to the thickneſs of the bubble at the time the ſame colour appeared upon it. For though the medium the light muſt paſs through to come at the water is, in one caſe, glaſs, and in the other, air; that makes no difference in the ſpecies of the colour reflected from the water: for pieces of Muſcovy glaſs, made thin enough to appear coloured, would have their colours faded, but not the ſpecies of them altered by being made wet with water: but it was found that tranſparent bodies of different denſity would not under the ſame thickneſs exhibit the ſame colours; for if the forementioned glaſſes were laid upon each other without any water between them, the air between them would then afford the ſame colours as the water, but more expanded; ſo that each ring had a larger diameter, though they bore all the ſame proportion to each other; ſo that the thickneſs of the air, proper to reflect each colour, was in the ſame proportion larger than the thickneſs of the water adapted to reflect the ſame.

Farther, all the light which is not reflected by the thin ſubſtances, whether of air or water contained between the glaſſes, is tranſmitted through them; for when viewed from the other ſide, they exhibit alſo coloured rings as before, but in a contrary order; for the middle ſpot, which in the other view appears black for want of reflecting light, now looks perfectly white; next without this ſpot the light appears tinged with a yellowiſh red; where the white appeared before, it now ſeems black, and ſo of the reſt.

It is farther obſervable that the forementioned thin plates, whether of air or water, did not appear of the ſame colour when viewed obliquely, as when ſeen direct; for if the rings and colours between a convex and plain glaſs be viewed firſt in a direct manner, and then under different degrees of obliquity, the rings will be obſerved to dilate themſelves as increaſed. But a plate of air between the glaſs alters its colour much ſooner than the water in the bubble, which is ſurrounded with air: for in the water, when viewed obliquely, the ſame colour might be ſeen at more than 12 times the thickneſs it appeared at under a direct view; but when the air was viewed under ſuch an obliquity, that the thickneſs of the plate, where it was obſerved, was but half as much again as when it was viewed directly, a different colour appeared.

Laſtly, the ſame colour reflected from a denſer ſubſtance reduced to a thin plate, and ſurrounded by a rarer, will be more briſk than the ſame colour, when reflected from a thin plate formed of the rarer ſubſtance, and ſurrounded by the denſer; as was found by blowing glaſs very thin, which exhibited in the open air more vivid colours than the air does between two glaſſes.

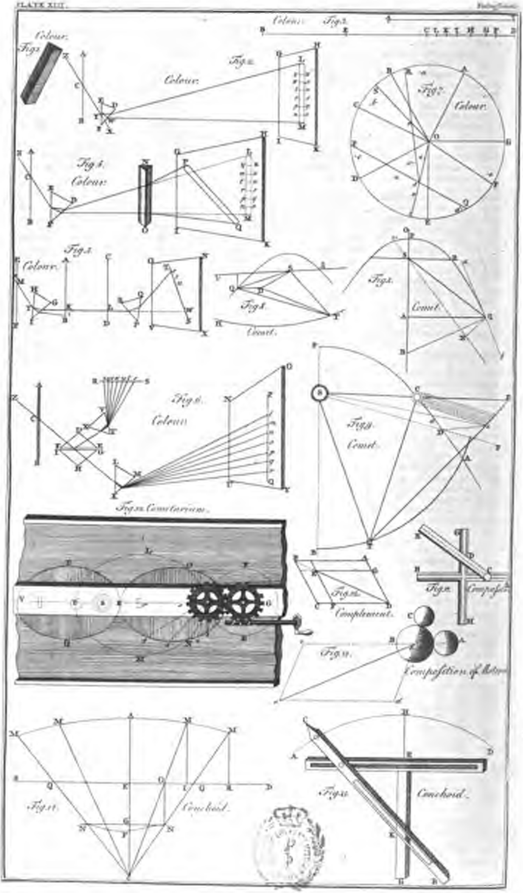
As to the thickneſs of the plate of air by which the ſeveral colours were reflected, it was found by carefully meaſuring the diſtances of the rings from the points where the glaſs is touched, that the diſtance between the glaſſes where the firſt order of colours was reflected, was from $\frac{1}{178000}$ to $\frac{3}{178000}$ part of an inch; that where the ſecond, was from $\frac{3}{178000}$ to $\frac{5}{178000}$; that where the third, from $\frac{5}{178000}$ to $\frac{7}{178000}$, and ſo in a ſeries of the odd numbers: and that the diſtance of the glaſſes, where the firſt order of colours that was tranſmitted paſſed through, was from 0 to $\frac{2}{178000}$ part of an inch; that where the ſecond, was from $\frac{2}{178000}$ to $\frac{4}{178000}$; that where the third, from $\frac{4}{178000}$ to $\frac{6}{178000}$, and ſo on in a ſeries of the even numbers. And the thickneſs of a plate of water, where it reflected or tranſmitted the ſame colours, was $\frac{3}{4}$ of the thickneſs of the plate of air.

Now we learn from experiments made with the microſcope, that the leaſt parts of almoſt all bodies are tranſparent; or the ſame may be experienced in the following manner: Take a very thin plate of the opaqueſt body, and the room being darkened, apply it to a ſmall hole in the window-ſhutter, and it will ſufficiently diſcover its tranſparency. This experiment cannot be ſo well performed with a white body, becauſe of the ſtrong reflecting power in ſuch; but even thoſe, when diſſolved in aquafortis or other proper menſtruums, do alſo become tranſparent. Wherefore if we ſhould ſuppoſe any body reduced to a thinneſs proper to produce any particular colour, and then broken into fragments, in all probability each fragment would exhibit that colour, and a heap of ſuch fragments would conſtitute a body of that colour; ſo that the cauſe, why ſome bodies reflect one ſort of rays moſt copiouſly, and ſome another, is probably no other than the different magnitude of their conſtituent particles.

This Sir Iſaac Newton thinks a probable ground for making conjectures concerning the magnitude of the conſtituent particles of bodies. The green of vegetables he takes to be of the third order, as likewiſe the blue of the ſyrup of violets. The azure colour of the ſky he thinks is of the firſt order, as alſo the moſt intenſe luminous white; but if it is leſs ſtrong, he then conjectures it to be a mixture of the colours of all the orders. Of the latter ſort he takes the colour of linen, paper, and ſuch like ſubſtances to be; but white metals to be of the former ſort. For producing black the particles muſt be ſmaller than for exhibiting any of the colours, viz. of a ſize anſwering to the thickneſs of the bubble where it reflected little or no light, and for that reaſon appeared colourleſs.

The colours in the ſame part of a peacock's tail vary as the tail changes its poſture with reſpect to the eye; juſt ſo the thin plates of air or water appear of a different colour in the ſame plate when viewed directly, from what they do when ſeen obliquely, as was obſerved above.

PLATE XIII.


Colour. Fig.1
Colour. Fig.2
Fig.3 Colour
Fig.4 Colour
Fig.5 Colour
Fig.7 Colour
Fig.8 Comet
Fig.1 Comet
Fig.6 Colour
Fig.9 Comet
Fig.10 Cometarium
Fig.12 Complement
Fig.11 Composition
Fig.13 Composition of Motion
Fig.14 Conchoid
Fig.15 Conchoid

The colours of ſilks, cloths, and other ſubſtances, which water or oil can intimately penetrate, become faint and dull by being wet with ſuch fluids, and recover their brightneſs when dry; juſt as we obſerved that plates of Muſcovy glaſs grow faint and dim by wetting: all which particulars, and many more that might be produced, abundantly prove the preſent propoſition.

Colour, in painting, is applied both to the drugs made uſe of in that art, and to the tints produced by thoſe drugs variouſly mixed and applied.

Colours may be either pigments or fluids. By pigments is meant all ſuch ſolid bodies as require to be mixed with ſome fluid, as a vehicle, before they can be uſed as paints, except in the caſe of crayons, where they are uſed dry. Theſe make the far greater part of the whole; the fluid colours being only a ſmall number employed along with water-colours; and aſphaltum, which is ſometimes employed in oil-painting.

Colours are diſtinguiſhed into ſeveral kinds, according to the vehicles in which they are worked, as oil-colours, water-colours, enamel-colours, &c. The ſame ſorts of pigments, however, are, in many inſtances, employed in more than one kind of painting, as vermillion and lake in ſeveral, and ultramarine in all.

The principal qualities in colours, conſidered with regard to their perfection or faultineſs, are two; purity of colour, and durableneſs: purity of colour is, by the painters, called *brightneſs*, and the defect of it *foulneſs*, or ſometimes the breaking the colour: durableneſs is called *ſtanding*, and the negative, or want of it, *flying*, or flying off; which terms, for conciſeneſs, we ſhall uſe in ſpeaking of theſe qualities.

Brightneſs and ſtanding well are the only properties which are neceſſary to the perfection of every kind of colours, and they equally relate to all; but there are others which are eſſential to many ſorts, with regard only to particular purpoſes and uſes.

The moſt conſiderable of the more general properties of colours, after purity and durableneſs, or brightneſs and ſtanding well, are tranſparency and opacity; for according to their condition with reſpect to theſe qualities, they are fitted to anſwer very different kinds of purpoſes. Colours which become tranſparent in oil, ſuch as lake, Pruſſian blue, and brown pink, are frequently uſed without the admixture of white, or any other opaque pigment; by which means the teint of the ground on which they are laid retains, in ſome degree, its force; and the real colour produced in the painting is the combined effects of both. This is called glazing, and the pigments endued with ſuch property of becoming tranſparent in oil, are called glazing colours. The ſame holds good alſo of ſuch colours as are tranſparent in water; only when they are there uſed in this manner, they are not called glazing, but waſhing, colours. When colours have no degree of ſuch tranſparency in the vehicle in which they are uſed, as vermilion, king's yellow, and ſeveral others, they are ſaid to have a body, and to cover. The property of glazing or waſhing is of ſo much importance, both in oil and water, that no other method can equally well produce the ſame effect in many caſes, either with regard to the force, beauty, or ſoftneſs of the colouring; and it is therefore very eſſential to the perfection of ſeveral kinds of pigments, that they ſhould poſſeſs this property in a complete degree; but, in other inſtances, the uſing colours with a ſtrong body is not leſs neceſſary, eſpecially for the grounding or laying in, as it is called, of many objects to be painted.

There is another material quality in colours, that relates only to their uſe in oil, which is the drying well, and, as it is called, not fattening. By fattening is meant a coagulation of the oil, that frequently happens on its commixture with ſeveral kinds of pigments, by the effect they have upon it; from whence, after ſome time keeping, it is rendered of ſo viſcid or glutinous a conſiſtence, as to be wholly incapable of being worked with either bruſh or pencil. This quality, when found in them, deſtroys almoſt wholly the value of ſuch pigments for the purpoſes of the colourmen, who ſell a great part of them ground in oil, and tied up in pieces of bladder, where they are kept till there is a demand for them, which frequently does not happen ſoon; and, therefore, gives time for their ſpoiling, in conſequence of this quality. But to painters who mix the colours for themſelves on their pallets with the oil, this property is not an equal inconvenience, when in a leſſer degree; only, in general, it muſt be obſerved, that colours, in proportion to their tendency to fatten, are ſlow in drying; and when the oil once contracts this ſtate, it will be a very long time before it will become duly hard and firm in the painting.

There are two other qualities of colour in general that relate only to their teint, or hue; but which render them, nevertheleſs, fit or improper, in a very material degree, for different purpoſes. They are diſtinguiſhed by the names of *warmth* and *coolneſs*; terms which, indeed, are uſed very frequently by painters, but, for the moſt part, very indefinitely, and without any preciſe or clear meaning. What is meant, when properly uſed, by warmth, is that fiery effect which a ſmall addition of yellow gives to a true red, and that glowing appearance which red imparts to either yellow or blue. By warmth, therefore, in red, is to be underſtood a ſmall inclination towards orange; by the ſame term applied to yellow, a like tendency by the admixture of red; and by the ſame again, in the caſe of blue, muſt be underſtood its ſlightly verging on the purple.

By coolneſs is to be underſtood the oppoſite to warmth; but this term is ſeldom uſed, except in ſpeaking of yellow and blue; and there it means either the negation of that which cauſes warmth, or a tendency to green, in either colour, by a ſlight admixture of the other.

The ſenſe of the word warmth, when applied to colouring, or the combined appearance of various teints, muſt not be confounded with that which it has when ſpeaking of particular colours; for there it relates to the producing a ſtrong effect by the diſpoſition or contraſt of the colours, or the groſſneſs of the teints, and not the qualities peculiar to, or inherent in, the colours themſelves.

The colours uſed in all the ſeveral kinds of painting, except ſome peculiar to enamel, are as follows:

Claſs I. Red—Vermilion, native cinnabar, red lead, ſcarlet oker, common Indian red, Spaniſh brown, terra de Sienna burnt; theſe are ſcarlet, or tending to the orange. Carmine, lake, roſe-pink, red oker, Venetian red; theſe tend to the crimſon, or to the purple.

Claſs II. Blue—Ultramarine, ultramarine aſhes, Pruſſian blue, verditer, cendre blue, or ſanders blue, indigo, ſmalt, bice, litmus, or lacmus.

Claſs III. Yellow—King's yellow, Naples yellow, yellow oker, Dutch pink, Engliſh pink, light pink, gamboge, meſticot, common orpiment, gall-ſtone, terra de Sienna unburnt, turpith mineral, yellow berry-waſh, turmeric waſh, tincture of ſaffron.

Claſs IV. Green—Verdigriſe, diſtilled verdigriſe, or cryſtals of verdigriſe, Pruſſian green, terra vert, ſap green.

Claſs V. Orange—Orange lake.

Claſs VI. Purple—True Indian red, archal, logwood waſh.

Claſs VII. Brown—Brown pink, biſtre, brown oker, umbre, Cologne earth, aſphaltum, Spaniſh juice, or extract of liquorice.

Claſs VIII. White—White flake, white lead, calcined hartſhorn, pearl white, troy-white, egg-ſhell white.

Claſs IX. Black—Lamp black, ivory black, blue black, Indian ink. See each under its proper article.

Theſe are all the colours at preſent in uſe in this country, in any kind of painting, except ſuch as are peculiar to enamel; in which kind of painting, as but few of theſe are capable of combining with glaſs, and enduring the neceſſary heat without changing their nature, or being deſtroyed, others are employed more ſuitable to vitrification: for which ſee the article **Enamel** *Painting*.

Theory for mixing of **Colours**. There are two things to be principally conſidered in regard to colours; namely, the hue, (which is properly what may be called the colour) and the ſtrength of light and ſhadow: for as different colours, ſuppoſe red and green, may have the ſame ſtrength of light, ſo two things, that are one of them much darker than the other, may ſtill have the ſame hue as a light blue and a dark blue.

With reſpect to the hue, theſe two things are to be conſidered. 1°. The ſpecies of colour, and 2°. The perfection and imperfection of colour under the ſame ſpecies. Colours differ in ſpecies, as blue and red, and colours of the ſame ſpecies differ in degrees of perfection, as the red of a field poppy is much more perfect than the red of a brick. This quality of perfection and imperfection in the colours, by the painters, is expreſſed by the terms bright, or clean or ſimple, and broken, which is taken from their method of making the imperfect colours by the mixture of other colours, which is called breaking the colours. With reſpect to this quality of colours, Sir Iſaac Newton, in his Treatiſe on Optics, ſhews that every ray of light has its proper colour, which it always carries with it, and never loſes, in whatever manner it happens to be reflected or refracted. Theſe natural colours of the rays are the bright ſimple colours, and the natural order of them, as they appear when they are ſeparated by the refraction of a priſm, is red, orange, yellow, green, blue, indico, violet: all the leſs perfect or broken colours are made by the compoſition and mixture of theſe ſimple colours, as yellow rays mixed with blue rays make a green, but not ſo perfect as the ſimple natural rays that are green; and red and yellow rays make an orange colour, but not ſo perfect as the natural orange-coloured rays. And by a juſt proportion of all the natural rays together, is produced whiteneſs, which is indifferent to all the ſimple colours, and cannot be ſaid to incline more to one colour than to another. By white is to be underſtood any colour between the lighteſt white and the darkeſt black; for as we are not now conſidering the degrees of light and ſhade, all the colours from black to white are to be conſidered as of the ſame hue.

According to this obſervation of the nature of whiteneſs, it appears that the broken colours are a medium between the ſimple colours and white; and the more broken a colour is, the nearer it is to white, and the further it is from white, the more ſimple it is.

Having thus explained the nature of the colours, and the effect of their mixture, in order to find exactly what colour will be produced by the mixture of any colours given, the colours are to be diſpoſed in the following manner. Let there be a circle, as A D F A (plate XLII. *fig.* 7.) deſcribed, and let the circumference be divided into ſeven parts A B, B C, C D, D E, E F, F G, G A, in the ſame proportion to one another as the fractions $\frac{1}{9}$, $\frac{1}{16}$, $\frac{1}{10}$, $\frac{1}{9}$, $\frac{1}{10}$, $\frac{1}{16}$, $\frac{1}{9}$; which are the proportions of the muſical notes *Sol*, *la*, *fa*, *ſol*, *la*, *mi*, *fa*, *ſol*. Between A and B place all the kinds of red, from B to C place all the kinds of orange, from C to D place all the kinds of yellow, from D to E place all the kinds of green, from E to F place all the kinds of blue, from F to G place all the kinds of indico, and from G to A place all the kinds of violet. Having thus diſpoſed the ſimple colours, the center of the circle O will be the place of white. And between the center and the circumference are the places of all the broken compounded colours, thoſe neareſt the center being the moſt compounded, and thoſe fartheſt from it being the leaſt compounded: as in the line O 1, all the colours at 1, 2, 3, 4, are of the ſame ſpecies; that is, green inclining toward blue; but the colour at 1 is the ſimple natural colour; that at 2 is ſomething compounded, or broken; that at 3 is more broken; and that at 4 is ſtill more broken.

The colours being thus diſpoſed, to know what colour reſults from the mixture of any colours given, find the center of gravity of the places of the colours given, and that will ſhew the character of the compound. For example, ſuppoſe it were required to know what colour would reſult from the mixture of two parts of the ſimple yellow at P, with three parts of the ſimple blue at Q; firſt find the center of gravity 3 of the points P and Q thus: draw P Q, and having divided it into five parts, (which is the ſum of three and two) take the point 3 three parts from P, (becauſe there are three parts of blue) and two parts from Q (becauſe there are two parts of the colour at P); then draw O 3 cutting the circumference in *s*, by the place of the point 1, (which is between D and E, but nearer to E) we find the mixture is a green inclining towards blue; but becauſe 3 is near the middle between the center and the circumference, the colour is pretty much broken. To make the ſame thing more clear by another example; ſuppoſe I would know what would reſult from a mixture of two parts yellow at P, three parts blue at Q, and five parts red at R. Firſt I find the place 3 of the mixture of the yellow and the blue, as before; then drawing the line 3 R (becauſe there are five parts of the colour at 3, and five parts of the colour at R) I divide it into ten parts, and take the point *r* five parts diſtant from R. By this means *r* is the center of gravity of the three colours at P, Q, and R, and is conſequently the place of the mixture; which by drawing O *r* cutting the circumference in *s*, I find to be an orange a little inclining towards red; and becauſe *r* is much nearer the center than the circumference, the colour is very much broken: and thus one may proceed in other caſes.

Again, having given the place of any compound colour, one may find what colours may be mixed to compound it. Thus, having given the colour at 3, drawing any line P 3 Q through 3, the colour propoſed may be made by a mixture of the colours in P and Q, taking ſuch a proportion of them as is expreſſed by the lines 3 P and 3 Q; that is, taking of the colour P as much as is proportion to 3 Q, and as much of the colour Q as is in proportion to 3 P; or having drawn O 3 paſſing thro' the points 1, 2, 4, the ſame colour may be produced by mixing the colours in 2 and 4 in proportion to the lines 4, 3, and 2, 3; or it may be produced by breaking the ſimple colour at 1, with white (which is at O) in the proportion of the lines 3, 1, and 3 O: and thus in other caſes.

The proportions hitherto mentioned of the colours to be uſed in the mixtures, relate to the quantity of the rays of light, and not to the materials which artificial colours are made of. Wherefore if ſeveral artificial colours were to be mixed according to theſe rules, and ſome of them are darker than others, there muſt be a greater proportion uſed of the darker materials, to produce the hue propoſed, becauſe they reflect fewer rays of light in proportion to their quantities; and a leſſer proportion muſt be uſed of the lighter materials, becauſe they reflect a greater quantity of light.

If the nature of the material colours, which are uſed in painting, was ſo perfectly known, as that one could tell exactly what ſpecies of colour, how perfect, and what degree of light and ſhade each material has with reſpect to its quantity, by theſe rules one might exactly produce any colour propoſed, by mixing the ſeveral materials in their juſt proportions. But though theſe particulars cannot be known to ſufficient exactneſs for this purpoſe, beſides the tediousneſs that would be in practice, to meaſure the colours according to their exact proportions; yet the knowledge of this theory may be of great uſe in painting. Suppoſe, for example, I had a pallet provided with the ſeveral colours at *a*, *b*, *c*, *d*, *e*; ſuppoſe for inſtance at *a*, carmine; at *b*, orpiment; at *c*, pink; at *d*, ultramarine; at *e*, ſmalts; and I had occaſion to make a broken green, ſuch as I judge ſhould be placed at *x*. I ſee that it does not lie a great deal out of a line drawn through *c* and *d*; therefore I conclude, that mixing the colours *c* and *d* will come very near to what I want: but becauſe *x* is nearer to the center O than the line *c d*, having brought my tint as near as I can to what I want, ſuppoſe to *z*, I look from *z* croſs *x* for ſome colour oppoſite to *z*, to break the tint with, and I find the neareſt to be *a*; therefore by mixing of the colour *a*, I bring the compoſition to the tint I have occaſion for. If the colour *a* carries the tint too much towards the line O D, I put a little more of the colour *d*, which brings it into the right place: or having got the tint *z*, I might have broken it with white, whoſe place is at the center O: or putting a greater proportion of the colour *d*, inſtead of *a*, I may afterwards break the tint by means of the colour *b*. And in the ſame manner, by only inſpecting this ſcheme, one may ſee in what manner to make any tints whatſoever that can be produced by the colours that one uſes. Thus one ſees that red and yellow make a brown orange colour, which may ſtill be more broken by adding blue, or indico, or violet, which are to be taken one or other, as one would have the tint inclined more to the yellow or to the red, blue bringing it towards the yellow, and breaking it too much, and violet carrying it towards the red, and not breaking it ſo much.

From theſe principles one may ſee the reaſon why the materials of the brighteſt and ſimpleſt colours are the moſt valuable, and of them why the lighteſt are moſt to be eſteemed. The ſimpleſt colours are the moſt valuable, becauſe they cannot be produced by mixture; for mixture always breaks the colours: ſuppoſe *a*, *b*, *c*, *d*, *e*, to be all the colours you have, then drawing lines to join the points *a*, *b*, *c*, *d*, *e*, all the tints that can be produced by thoſe colours will have their places within the area of the polygon *a b c d e*. That the lighter colours are more valuable than the dark ones, is becauſe black does not break the colours ſo much as white; ſo that it is eaſier to make the clean dark tints with light colours and black, than to make the bright light ones with dark colours and white: for, by what has been ſhewed, white breaks the colours very much, but black, being nothing but the abſence of light, only darkens the colours; though upon account of the imperfection of the materials that are in uſe, black does alſo break the colours ſomething, becauſe there is no material ſo perfectly black as to have no colour at all, as one ſees by the beſt blacks having lights and ſhades. There will be other exceptions alſo to be made in the application of theſe obſervations to practice, upon account of the particular qualities of the materials ſome colours are made of. If all the colours were as dry powders, which have no effect upon one another, when mixed, theſe obſervations would exactly take place in the mixing of them: but ſome colours are of ſuch a nature, that they produce a very different effect upon their mixture, to what one would expect from theſe principles: ſo that it is poſſible there may be ſome darker materials, which, when diluted with white, may produce cleaner and leſs compounded colours than they gave when ſingle; as ſome colours do very well to glaze with, which do not look well when laid on in a body.

Colour, in heraldry. The colours generally uſed in heraldry are red, blue, black, green, and purple, which heralds call gules, azure, ſable, vert, or ſinople, and purpure. Tenne, or tawny, and ſanguine, are not ſo common. As to yellow and white, called or and argent, they are metals, not colours. Theſe metals and colours are ſometimes alſo expreſſed in blazon by the names of precious ſtones, and ſometimes by thoſe of planets, or ſtars.

Œnomaus is ſaid to have firſt invented the diſtinction of colours, to diſtinguiſh the gundillæ of combatants of the Circenſian games: the green for thoſe who repreſented the earth, and the blue for thoſe who repreſented the ſea.

Colours *uſed in Dying*. There are in the art of dying five colours, called ſimple, primary, or mother colours, from the mixture of which all other colours are formed; theſe are blue, red, yellow, brown, and black. Of theſe colours, variouſly mixed and combined, they form the following colours, panſy, blue, and red; from the mixture of blue and ſcarlet are formed amaranth, violet, and panſy; from the ſame mixture of blue, crimſon, and red, are formed the columbine or dove colour, purple, crimſon, amaranth, panſy, and crimſon-violet.

Here it is to be obſerved, that they give the name crimſon to all colours made of cochineal.

Of blue and red madder is dyed purple, pepper colour, tan colour, and dry-roſe colour.

The ſame blue, with red, half in grain, makes amaranth, tan colour, and dry-roſe colour.

Blue and half-red crimſon compoſe amaranth, tan colour, dry-roſe, a brown panſy, and ſun-brown.

Blue and yellow mixed together compoſe a yellow-green, ſpring-green, graſs-green, laurel-green, brown-green, dark-green; as well as ſea-green, parrot-green, cabbage-green, &c. theſe three laſt colours are to be leſs boiled than the reſt.

This is to be noted, that as to green there is no ingredient or drug in nature that will dye it, but the ſtuffs are dyed twice, firſt in blue, then in yellow.

Blue and brown. Theſe two colours are never mixed alone, but with the addition of red, either of madder or cochineal, they form ſeveral colours.

Red and yellow. All the ſhades compoſed of theſe two colours, as gold-yellow, aurora, marygold, orange, nacarat, granat-flower, flame colour, &c. are made with yellow and red of madder; ſcarlet being leſs proper as well as too dear.

Red and brown. Of theſe two colours are formed cinnamon colour, cheſnut, muſk, bears-hair, and even purple, if the red be that of madder.

Yellow and brown. The colours formed from theſe two are all the ſhades of feuille-mort and hair colours.

But this may be taken notice of, that though it be ſaid that there are no colours or ſhades made from ſuch and ſuch mixtures, it is not meant that none can be made, but that they are more eaſily formed from a mixture of other colours.

Colour, in law, is a probable or plauſible plea, tho' really falſe in itſelf, and only calculated to draw the trial of the cauſe from the jury to the judge.

COLOURING, among painters, the manner of applying and conducting the colours of a picture; or the mixtures of light and ſhadows formed by the various colours employed in painting.

The colouring is one of the chief branches in painting, which art is, by Mr. Felibien, divided into three parts, the deſign, the compoſition, and the colouring. See the article Painting.

Though the colouring ſtrikes moſt, yet, among maſters, it always gives place to the exactneſs of the deſign. According to M. de Piles, the word colouring, in a more limited ſenſe, is chiefly applicable to a hiſtory-piece, ſcarce at all to landſcapes: he adds, that the term relates more immediately to the carnations than to any thing elſe. The colouring, in its general ſenſe, comprehends whatever relates to the nature and union of colours; their agreement or antipathy; how to uſe them to advantage in light and ſhadow, ſo as to ſhew a relievo in the figures, and a ſinking of the ground; what relates to the aerial perſpective, that is, the diminution of colours by means of the interpoſition of the air; the various accidents and circumſtances of the luminary, and the medium; the different light both of the bodies illuminating and illuminated; the reflections, ſhadows, and different views with regard to the poſition of the eye, or the object; what produces ſtrength, boldneſs, ſweetneſs, &c. in paintings, well coloured; the various manners of colouring, both in figures, landſcapes, &c.

The *coloris*, or colouring, is different from colour; the latter renders the object ſenſible to the eye; the former is that by which the painter knows how to imitate the colour of all natural objects, by a judicious mixture of the ſimple colours upon his pallet: it teaches the manner in which colours are to be uſed for producing thoſe fine effects of the *chiaro obſcuro*, light and ſhade, which add boldneſs and a kind of relievo to the figures, and ſhew the remoter objects in their juſt light.

For the effects of colours, painters regard either the union or the œconomy: with reſpect to the firſt, care muſt be taken that they be laid ſo as to be ſweetly united under the briſkneſs of ſome principal one; that they participate of the prevailing light of the piece; and that they partake of each other by the communication of light and the help of reflection.

For the œconomy in managing their degrees, regard is to be had to the contraſt or oppoſition intervening in the union of the colours; and by a ſweet interruption, the briſkneſs, which otherwiſe fades and palls, may be raiſed to the harmony which makes the variety of colours agree; ſupplying and ſuſtaining the weakneſs of ſome by the ſtrength of others; neglecting ſome places on purpoſe to ſerve as a baſis or repoſe to the ſight; and to enhance thoſe which are to prevail throughout the piece. As to the degradation, where, the better to proportion the colours that fall behind, ſome of the ſame kind are to be preſerved in their purity, as a ſtandard for thoſe carried afar off, to be compared by, in order to juſtify the diminution; regard being always had to the quality of the air, which, when loaded with vapours, weakens the colours more than when clear: to the ſituation of the colours, where care muſt be taken that the pureſt and ſtrongeſt be placed before, or in the front of the piece; and that, by their force, the compound ones, which are to appear at a diſtance, be kept back, particularly the glazed colours, to be uſed in the firſt rank: laſtly, regard muſt be had to the expreſſion of the ſubject, and the nature of the matters or ſtuffs, whether ſhining or dull, opaque or tranſparent, poliſhed or rough.

Colouring *and non-colouring Drugs.* Into theſe dyers diſtinguiſh their ingredients: the firſt are applicative, and communicate their colours to the matters boiled in them, or paſſed through them, as woad, ſcarlet-grain, cochineal, indigo, madder, turmeric, &c.

The ſecond ſerve to prepare and diſpoſe the ſtuffs and other matters, and to extract the colour out of the colouring ingredients; as alum, ſalt or cryſtal of tartar, arſenic, realgal, ſalt-petre, common ſalt, ſal ammoniac, ſal gemmæ, agaric, ſpirit of wine, bran, peas-flour, wheat, ſtarch, lime, and aſhes.

COLT, in zoology, the ſame with foal, being the young of the horſe-kind. See Foal.

Colt-Evil, among farriers, a ſwelling of the yard and cods, incident both to ſtoned horſes and geldings; for which, after waſhing the part with luke-warm vinegar, it is uſual to anoint them with juice of rue, mixed with honey, and boiled in hog's greaſe, adding bay-leaves and the powder of fenugreek.

Colt's Foot, in botany, the Engliſh name of the tuſſilago. See Tussilago.

COLTIE, a term uſed by timber-merchants for a defect, or blemiſh, in ſome of the annular circles of a tree, whereby its value is much diminiſhed.

COLUBRINUM Lignum, ſnake-wood. See Nux Vomica.

COLUMBA, pigeon. See Pigeon.

COLUMBINE, *Aquilegia*, in botany. See the article Aquilegia.

Columbine *Colour*, or dove-colour, among painters, denotes a kind of violet.

COLUMBUS, or *Congregation of St.* Columbus, a ſociety of regular canons, who formerly had an hundred abbies or monaſteries in the Britiſh iſlands.

COLUMN, in architecture, a round pillar, made to ſupport and adorn a building, and compoſed of a baſe, a ſhaft, and a capital. As every fulcrum is ſo much the more perfect, as it is firm, or carries the appearance of firmneſs; hence all columns ought to have their baſe broader than themſelves. See the article Base.

And as a cylinder and a quadrangular priſm are more eaſily removed out of their place than a truncated cone, or a pyramid on the ſame baſe, and of the ſame altitude, the figure of columns ought not to be cylindrical, but grow leſs and leſs, like a truncated cone. Again, as columns are more firm if their diameter bears a greater proportion to their height than if it bore a leſs, the greater ratio is to be choſen where a large weight is to be ſuſtained; and leſs, where a ſmall weight is to be ſupported. Further, as the deſign of a column is to ſupport a weight, it muſt never be ſuppoſed without an entablature.

Columns are different in the different orders of architecture, and may be conſidered with regard to their matter, conſtruction, form, diſpoſition, and uſe. With reſpect to the order, we have

Tuſcan Column, that which has ſeven diameters in height, and is the ſhorteſt and moſt ſimple of all the columns See Plate XLIII. and the article Tuscan *Order*.

Its diminution is one fourth; that is, the diameter at top is three fourths of the diameter juſt above the baſe.

Doric Column has eight diameters in height, and its capital and baſe more inriched with mouldings than the Tuſcan. It diminiſhes one fifth part of the diameter at the baſe. See Plate XLIII. and the article Doric.

Ionic Column has nine diameters in height, and differs from the others by the volutes in its capital, and by its baſe. See Plate XLIII. and the article Ionic.

Corinthian Column, the richeſt and moſt delicate of all, has ten diameters in height, and its capital adorned with two rows of leaves with caulicoles, from whence ſpring ſmall volutes. It diminiſhes one ſeventh part of the diameter. See Plate XLIII. and the article Corinthian.

Compoſite Column has likewiſe ten diameters in height, and two rows of leaves in its capital, with angular volutes like the Ionic. It diminiſhes one eighth part of the diameter of the baſe. See Plate XLIII. and the article Composite.

It may be obſerved, that different authors give different heights and proportions to columns of the ſame order, and that frequently the ſame author takes the liberty of diſpenſing with his own rules; but the heights and proportions exhibited above are a mean between the extremes of all the reſt.

Columns *with regard to their Matter*, are:

Fuſible Column comprehends not only columns of various metals, and other fuſible matter, as glaſs, &c. but alſo thoſe of ſtone, ſaid to be caſt, the ſecret of which ſome believe to have been known to the ancients.

Hydraulic Column, that whoſe ſhafts appear to be of cryſtal; being formed by a number of little threads of water, falling from holes made in a girt of metal, at equal diſtances, by means of a pipe mounting through the middle of it. It alſo denotes a column from whoſe top proceeds a jet d'eau, to which the capital ſerves as a baſon, whence the water deſcends by a little pipe, which turns ſpirally round the ſhaft.

Moulded Column, that made by impaſtation of gravel and flints of divers colours, bound together with a cement.

Water Column, that whoſe ſhaft is formed of a large jet d'eau, which ſpouting out water violently from the baſe, drives it within the tambour of the capital, which is hollow, and in falling down it reſembles a column of liquid cryſtal.

Columns, *with regard to their Conſtruction.*

Cabled or *Rudented* Column, that having projectures in form of cables, in the naked of the ſhaft, each cable having an effect oppoſite to that of a fluting, and accompanied with a little liſt on each ſide.

Coloſſal Column, one of ſo large a ſize as not to enter any ordinance of architecture, but deſigned to be placed ſolitary in the middle of a ſquare, &c. Such is the Trajan column.

Corollitic Column, that adorned with foliages, turned ſpirally round the ſhaft, or in form of crowns and feſtoons: they are very proper for decorations of theatres.

Diminiſhed Column, that which has no ſwelling, but begins to taper from the baſe, in imitation of trees.

Geminated Column, that whoſe ſhaft is formed of three ſimilar and equal ſides or ribs of ſtone, fitted within one another, and faſtened at bottom with iron pins, and at top with cramp-irons: it ought to be fluted, that the joints may be leſs diſcernible.

Column *of Joinery*, that made of ſtrong timber-boards joined together: it is hollow, turned in the lathe, and uſually fluted: ſuch are the columns of moſt altar-pieces.

Column *of Maſonry* is made of rough ſtone, well laid and covered with plaſter; or of bricks, laid triangular-wiſe, and covered with ſtucco.

Column *of Tambours*, or *Bands*, that whoſe ſhaft is formed of ſeveral courſes of ſtone, or blocks of marble, leſs high than the diameter of the column.

Column *in Truncheons*, or *Pieces*, conſiſts of two, three, or four pieces of ſtone or metal, differing from the tambours, as being higher than the diameter of the column.

Columns *with regard to their Form*, are:

Fluted Columns, called alſo channelled and ſtriated columns, thoſe whoſe ſhafts are adorned with flutes or channellings, either from top to bottom, or only two thirds of their height.

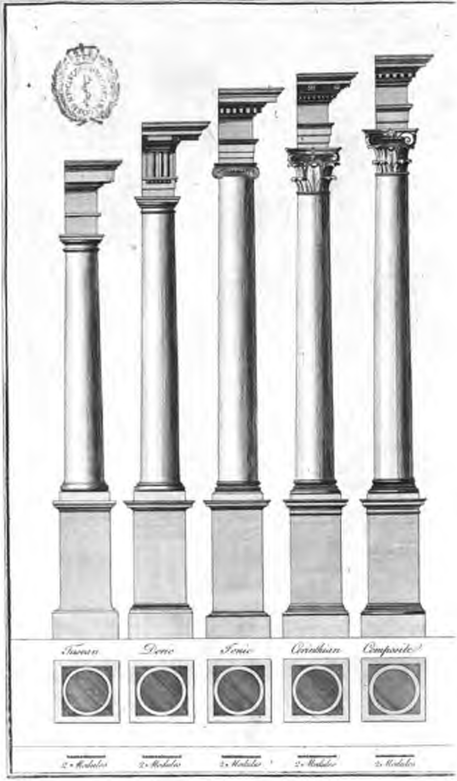
Gothic Column, a round pillar, either too ſhort for its bulk, or too ſlender for its height, having ſometimes twenty diameters, without either diminution or ſwelling, conſequently differing widely from the proportions of the antique.

Hermetic Column, a kind of pilaſter, in manner of a terme, having the head of a man in lieu of a capital. It is ſo called becauſe the ancients placed on the top of ſuch columns the head of Mercury.

Maſſive Column, one too ſhort for the order, the capital of which it bears: it likewiſe comprehends Tuſcan and Ruſtic columns.

Oval Column, that whoſe ſhaft has a flatneſs, its plan being made oval, to reduce the projecture.

PLATE XLIII. Facing Col


Tuscan
Doric
Ionic
Corinthian
Composite
2 Modules
2 Modules
2 Modules
2 Modules
2 Modules

Attic COLUMN, according to Pliny, is an inſulated pilaſter, having four equal faces, and of the higheſt proportion.

Cantoned COLUMNS are thoſe engraved in the four corners of a ſquare pillar, to ſupport four ſprings of an arch.

Coupled COLUMNS, thoſe diſpoſed two and two, ſo as almoſt to touch each other at their baſes and capitals.

Doubled COLUMN, one column joined with another in ſuch a manner that the two ſhafts penetrate each other with a third of their diameter.

Engaged COLUMN, that which enters in a wall with one third or one fourth of its diameter.

Grouped COLUMNS, thoſe placed on the ſame pedeſtal or ſocle, either by three and three, or four and four.

Inſulated COLUMN, one ſtanding free and detached from every other body.

Median COLUMNS, a name given by Vitruvius to the two columns in the middle of a porch, which have their intercolumniation larger than the reſt. The term may alſo be applied to the middle row of columns in a frontiſpiece adorned with three orders.

Niched COLUMN, that whoſe ſhaft enters with half its diameter into a wall, hollowed out for its reception with its plane parallel to the projecture of the tore.

COLUMNS, *with regard to their Uſe*, are either, 1ſt, Aſtronomical columns, ſuch as that at Paris, erected for aſtronomical obſervations. 2. Chronological column. 3. Funeral column, which generally bears an urn, and has its ſhaft overſpread with ſymbols of grief and of immortality. 4. Gnomonic column, a cylinder, upon which the hour of the day is repreſented by the ſhadow of a ſtyle: of theſe there are two kinds; in the one the ſtyle is fixed, and the hour-lines are no more than the projection of a vertical dial upon a cylindrical ſurface: in the other the ſtyle is moveable, and the hour-lines are drawn to the different heights of the ſun in the different ſeaſons of the year. 5. Hiſtorical column, that whoſe ſhaft is adorned

particular country, or ſome memorable action. 21 Triumphal column, that erected by the antients in honour of an hero; the joints of the ſtones or courſes of which were covered with as many crowns as he had made military expeditions. 22. Zoophoric column, a kind of ſtatuary column, bearing the figure of ſome animal.

Scenography of a COLUMN. See the article SCENOGRAPHY.

COLUMN, among printers, is half a page, when the page is divided into two parts from top to bottom.

COLUMN, in the military art, a long deep file of troops or baggage.

The firſt and ſecond lines of an army, as they are encamped, make generally two columns on a march, filing off either to the right or left: ſometimes the army marches in four, ſix, or eight columns, according as the ground will allow; and each column is led by a general officer.

COLUMNA, in anatomy, a term applied to different parts: thus the *columna naſi* is the loweſt and fleſhy part of the noſe, which forms a part of the ſeptum; and the *columna oris* is the ſame with the uvula. See SEPTUM and UVULA.

The columnæ cordis are ſmall, long, and round fleſhy productions in the ventricles of the heart. See HEART.

COLURES, in aſtronomy and geography, two great circles ſuppoſed to interſect each other at right angles, in the poles of the world, and to paſs through the ſolſtitial and equinoctial points of the ecliptic.

That which paſſes through the two equinoctial points is called the equinoctial colure, and determines the equinoxes; and the other, which paſſes through the poles of the ecliptic, is called the ſolſtitial colure, becauſe it determines the ſolſtices. See EQUINOX and SOLSTICE.

COMA, or COMA-VIGIL, a preternatural propenſity to ſleep, when, nevertheleſs, the patient does not ſleep, or, if he does, awakes immediately, without any relief. This diſorder is always ſymptomatic, and often attends ſerum through the noſe, and ſtimulate the nerves: and when a viſcid phlegm offends the ſtomach, vomits are uſeful, with powder of ſquills, or emetic tartar, with a laxative potion. In a ſanguine coma ſomnolentum, when the blood circulates ſlowly, or ſtagnates in the head, as in hypochondriac and ſcorbutic caſes, all hot ſpirituous remedies are as bad as poiſon; but bleeding, clyſters, gentle laxatives, cooling and nervous powders, are uſeful.

COMA BERENICES, Berenice's hair, in aſtronomy, a conſtellation in the northern hemiſphere, compoſed of ſtars near the lion's tail.

This conſtellation conſiſts of three ſtars, according to Ptolomy; of thirteen, according to Tycho; and of forty, in the Britannic Catalogue.

COMB, an inſtrument to clean, untangle, and dreſs flax, wool, hair, &c.

Combs for wool are prohibited to be imported into Britain.

COMB is alſo the creſt, or red fleſhy tuft, growing upon a cock's head.

Lady's COMB, or Venus's comb, in botany, the ſame with the ſcandix. See the article SCANDIX.

COMBAT, in a general ſenſe, denotes an engagement, or a difference decided by way of arms.

COMBAT, in our ancient law, was a formal trial of ſome doubtful cauſe or quarrel by the ſwords or battons of two champions. This form of proceeding was very frequent, not only in criminal, but in civil, cauſes; being built on a preſumption that God would never grant the victory but to him who had the beſt right. The laſt trial of this kind in England, was between Donald lord Ray, appellant, and David Ramſay, Eſq. defendant; when, after many formalities, the matter was referred to the king's pleaſure.

COMBATANT, in heraldry, a term for two beaſts, as lions, &c. borne in a coat of arms, in a fighting poſture, with their faces to each other.

COMBINATION is properly underſtood of an aſſemblage of ſeveral things by two and two: but is more particularly uſed in mathematics, to denote the variation or alternation of any number of quantities, letters, ſounds, or the like, in all the different manners poſſible.

P. Merſenne gives us the combinations of all the notes and ſounds in muſic, as far as 64; the ſum whereof amounts to 90 figures, or places.

The number of poſſible combinations of the 24 letters of the alphabet, taken firſt two by two, then three by three, &c. according to Mr. Preſtet's calculation, amount to 1391724288887252999425128493402200.

F. Truchet, in the Memoirs of the French Academy, ſhews, that two ſquare pieces, each divided diagonally into two colours, may be arranged and combined ſixty-four different ways, ſo as to form ſo many different kinds of chequer-work; which appears very ſurpriſing when we conſider that two letters, or figures, can only be combined twice.

Problem 1. Any number of quantities being given, together with the number in each combination, to find the number of combinations.

One quantity, we obſerve, admits of no combination; two, *a* and *b*, of one; of three, *a b c*, there are three combinations, viz. *ab*, *ac*, *bc*; of four, ſix, *ab*, *ac*, *bc*, *ad*, *bd*, *cd*; of five, ten, *ab*, *ac*, *bc*, *ad*, *bd*, *cd*, *ae*, *be*, *ce*, *de*; whence it appears that the number of combinations proceed as 1, 3, 6, 10, 15, &c. wherein, if we have n for the number of terms or quantities to be combined, we ſhall have $\frac{n}{1} \times \frac{n-1}{2}$ for all the different pairs that can be taken in the number of quantities n. If the propoſed combinations are to be taken three by three, $\frac{n}{1} \times \frac{n-1}{2} \times \frac{n-3}{3}$ will expreſs the number of combinations ſought: but if they are to be taken by fours, $\frac{n}{1} \times \frac{n-1}{2} \times \frac{n-2}{3} \times \frac{n-3}{4}$ will be the anſwer; and univerſally, if p be put for the number of quantities to be taken each time, then will $\frac{n}{1} \times \frac{n-1}{2} \times \frac{n-2}{3} \times \frac{n-3}{4} \times \frac{n-4}{5}$ &c. continued to p terms, repreſent the number of combinations of p things in n.

Example. Let the number of quantities to be combined be 8, and 4 the number of them to be taken; then by expounding n by 8, and p by 4, we ſhall have $8 \times \frac{7}{2} \times \frac{6}{3} \times \frac{5}{4}$, or 70, for the number of combinations required.

The number of all the poſſible combinations, beginning from the combinations of every two, will, by writing ſucceſſively for p the numbers 2, 3, 4, 5, &c. be $\frac{n}{1} \times \frac{n-1}{2} + \frac{n}{1} \times \frac{n-1}{2} \times \frac{n-2}{3} + \frac{n}{1} \times \frac{n-1}{2} \times \frac{n-2}{3} \times \frac{n-3}{4}$, &c. which is well known to be the ſum of the unciæ of the binomial $1+1$, raiſed to the n power, and abridged of the exponent of the power increaſed by unity $n+1$; therefore the number of all the poſſible combinations will be expreſſed by $2^n - n - 1$.

Problem 2. Any number of quantities being given, to find the number of changes and alterations which thoſe quantities, combined in all the manners poſſible, can undergo.

Suppoſe two quantities, *a* and *b*; their variations will be 2: conſequently as each of thoſe may be combined, even with itſelf, to theſe there muſt be added two variations. The whole number, therefore, will be $2+2=4$. If there were three quantities, and the exponent of the variation were 2, the combination will be 3, and the changes 9; to which if the three combinations of each quantity with itſelf, *aa*, *bb*, *cc*, be added, we ſhall have the number of changes $3+3+3=9$. In like manner it is evident, if the given quantities were 4, and the exponent 2, the number of changes would be 16; if 5, 25, &c. and, in general, if n, n^2.

Suppoſe the quantities 3, and the exponent of variation 3; the number of changes is found $27=3^3$; viz. *aaa*, *aab*, *aba*, *baa*, *abb*, *aac*, *aca*, *caa*, *abc*, *bac*, *bca*, *acb*, *cab*, *cba*, *acc*, *cac*, *cca*, *bba*, *bab*, *bbb*, *bbc*, *cbb*, *bcb*, *bcc*, *cbc*, *ccb*, *ccc*.

After the ſame manner it will appear, that if the quantities were 4, and the exponent 3, the number of changes would be $64=4^3$: and, in general, if the number of quantities be $=n$, and the exponent 3, the number of changes will be n^3. By thus proceeding, it will be found, that if the number of quantities be n, and the exponent n, the number of changes will be n^n; wherefore, if all the antecedents be added, where the exponent is leſs, the number of poſſible changes will be found $n^n + n^{n-1} + n^{n-2} + n^{n-3} + n^{n-4} + n^{n-5} + n^{n-6}$, &c. till at length, the number ſubtracted from n leaves 1, becauſe the beginning is from ſingle quantities taken once.

Since then the number of poſſible changes is in a geometrical progreſſion, whoſe firſt term is n, the greateſt n^n, and the ratio n, it follows that $\frac{n^{n+1}-n}{n-1}$ will expreſs the number of poſſible changes. Suppoſe v. gr. $n=4$, then $\frac{n^{n+1}-n}{n-1}$ will be equal to 340. Suppoſe, again, $n=24$, the number of poſſible changes will be 1391724288887252999425128493402200. In ſo many various manners, therefore, may the 24 letters of the alphabet be varied and combined among themſelves.

COMBINATORY, in general, denotes ſomething belonging to combination. See the preceding article.

COMBINATORY *Diſtillation*, a method of rectifying ſpirits, much practiſed by diſtillers, by diſtilling ſeveral ingredients along with the ſpirits; ſuch are alcaline ſalts, and ſpirits, and other ſaline bodies capable of giving the ſpirits a good flavour. This method is condemned by Dr. Shaw, becauſe theſe ingredients mix themſelves ſo intimately with the ſpirits, as not to be eaſily ſeparated again: hence, inſtead of rectifying or improving, they prevent the true and genuine taſte of the ſpirits.

COMBUST, an appellation given to a planet when in conjunction with, or not diſtant above eight degrees and thirty minutes from, the ſun: ſome reſtrain the term combuſt to the diſtance of half their diſk.

COMEDY, is a ſort of dramatic poetry, which gives a view of common and private life, recommends virtue, and expoſes the vices and follies of mankind in an humorous

morous and merry way. Scaliger defines comedy a dramatic poem, repreſenting the buſineſs of life, whoſe event is fortunate and ſtill familiar. Voſſius defines it a dramatic poem, copying the actions of the principal citizens and common people in a familiar ſtyle, and not without mirth and raillery.

Critics are much divided about the nature of comedy Ariſtotle calls it an imitation of the worſt, or rather, of the loweſt, claſs of perſons, by way of ridicule. Mr. Corneille finds fault with this, and maintains, that the actions of kings themſelves may enter comedy, provided they be ſuch as are not very momentous, unattended with any conſiderable danger. Mr. Congreve ſeems pretty much of the ſame ſentiment: but Mr. Dacier is of a contrary opinion: he maintains, that comedy allows of nothing grave or ſerious, unleſs it be turned to ridicule; and that raillery and ridicule are its only proper and genuine marks. Thus different are critics on the nature of comedy: nor are they better agreed concerning the characteriſtic which diſtinguiſhes it from tragedy. Some diſtinguiſh it by the lowneſs of the ſubject; others by the ridiculous light it is ſet in. According to F. Boſſu, comedy differs from tragedy in this, that the comic writer invents both the names of his perſons, and the action which he preſents; whereas the tragic-writers invent only the latter; the former they are to take from hiſtory.

Comedy has parts of quality and parts of quantity. Of the firſt kind there are four eſſential, the fable, the manners, the ſentiments, and the diction; to which two are added, which only relate to the repreſentation, viz. the muſic and decoration. See FABLE, MANNERS, &c.

The parts of quantity are alſo four. 1. The entrance. 2. The working up of the plot. 3. The full growth of the plot, or the counter-turn. 4. The diſcovery, or unravelling of the plot. Theſe in the language of the ancients, are called the protaſis, epitaſis, cataſtaſis, and cataſtrophe. See the articles PROTASIS, EPITASIS, ACT, &c.

With regard to the various revolutions comedy has undergone, it is commonly diſtinguiſhed into three kinds, viz. the ancient, the middle, and the new. The ancient comedy was ſharp, ſatirical, and extremely abuſive; even men of the firſt rank, if they were ſuſpected of any criminal behaviour, whether the facts were true or falſe, were brought upon the ſtage without any diſguiſe, called by their own names, and uſed as ſeverely as poſſible. Thus in the comedy of the Clouds, Ariſtophanes brings Socrates in by name. Indeed this liberty of abuſe was allowed chiefly to the chorus, and was moſt uſed during the democracy of the Athenians, eſpecially in the time of the Peloponneſian war. But when the thirty tyrants had ſeized the government, the middle comedy commenced; for it being no longer ſafe for the poets to rail at people in authority, and openly to charge magiſtrates with crimes, they ſtill continued to ridicule the follies and expoſe the vices of particular perſons under fictitious names; by which the perſons were ſo well pointed out, that it was no difficult matter to know them. At length, however, they were obliged, in the reign of Alexander the Great, to repreſs even this licenſe; and this reformation gave occaſion to the new comedy, which only brought upon the ſtage feigned adventures and imaginary names.

This laſt kind alone was received among the Romans, who nevertheleſs made a new ſubdiviſion of it into ancient, middle, and new, according to the various periods of the common-wealth. Among the ancient comedies were reckoned thoſe of Livius Andronicus; among the middle thoſe of Pacuvius; and among the new ones, thoſe of Terence. They likewiſe diſtinguiſhed comedy according to the quality of the perſons repreſented, and the dreſs they wore, into togatæ, prætexatæ, trabeatæ, and tabernariæ, which laſt agrees pretty nearly with our farces. Among us, comedy is diſtinguiſhed from farce, as the former repreſents nature as ſhe is; the other diſtorts and overcharges her. They both paint from the life, but with different views: the one to make nature known, the other to make her ridiculous.

COMET, in aſtronomy, an opaque, ſpherical, and ſolid body like the planets; and like them performs its revolutions about the ſun in an elliptical orbit, which has the ſun in one of its foci. The particulars in which comets differ from the planets are, that they move in various directions, ſome the ſame way with the planets, others the contrary; neither are their motions confined within the zodiac, their orbits admitting of any inclination to the ecliptic whatever: and the eccentricity of their orbits is ſo very great, that ſome of the comets perform the greateſt part of their motion almoſt in right-lines, tending in their approach to the ſun almoſt directly towards it, after which they paſs by it, and when they leave it, move off again nearly in a right line, till they are out of ſight, as if they were haſtening back to the fixed ſtars, and return not till after a period of many years.

The ancient Egyptians and Caldeans, (according to Diodorus Siculus) by a long courſe of obſervations, were able to predict the apparitions of comets. But ſince they are alſo ſaid, by help of the ſame arts, to have foretold the happening of earthquakes and tempeſts, it is certain their knowledge in theſe matters was rather the reſult of meer aſtrological calculation than of any aſtronomical theory of the celeſtial motions. And the Greeks, who were the conquerors of both theſe people, ſcarce found any other ſort of learning amongſt them than this: ſo that it is to the Greeks themſelves as the inventors (and eſpecially the great Hipparchus) that we owe this aſtronomy, which is now ſo much improved: but yet, amongſt theſe, the opinion of Ariſtotle (who would have comets to be nothing elſe than ſublunary vapours, or airy meteors) prevailed ſo far, that this moſt difficult part of the aſtronomical ſcience lay altogether neglected; for no one thought it worth while to take notice of, or write about, the wandering uncertain motions of what they eſteemed vapours floating in the æther: whence it came to paſs, that nothing certain, concerning the motions of comets, can be found tranſmitted from them to us.

But Seneca, the philoſopher, having conſidered the phænomena of two remarkable comets of his time, made no ſcruple to place them amongſt the celeſtial bodies, believing them to be ſtars of equal duration with the world. He indeed owns their motions were governed by laws not as then known or found out: yet almoſt all the aſtronomers differed from this opinion of Seneca; neither did Seneca himſelf think fit to ſet down thoſe phænomena of the motion, by which he was enabled to maintain his opinion; nor the times of thoſe appearances, which might be of uſe to poſterity, in order to the determining theſe things. And indeed we find nothing at all, in the accounts of comets, that can be of ſervice in this affair, before A. D. 1337, at which time Nicephorus Gregoras, a Conſtantinopolitan hiſtorian and aſtronomer, did pretty accurately deſcribe the path of a comet amongſt the fixed ſtars, but was too lax as to the account of the time; ſo that this moſt doubtful and uncertain comet only deſerves to be mentioned for the ſake of its having appeared near 400 years ago.

Then the next of our comets was in the year 1472, which being the ſwifteſt of all, and neareſt to the earth, was obſerved by Regiomontanus. This comet (ſo dreadful upon the account of the magnitude both of its body and the tail) moved forty degrees of a great circle in the heavens in the ſpace of one day; and was the firſt of which any proper obſervations are come down to us: but all thoſe that conſidered comets, until the time of Ticho Brahe, believed them to be below the moon, and ſo took but little notice of them, reckoning them no other than vapours.

But in the year 1577 (Ticho ſeriouſly purſuing the ſtudy of the ſtars, and being provided with large inſtruments fit for making celeſtial obſervations, with far greater care and certainty than the ancients could ever hope for) there appeared a very remarkable comet; to the obſervation of which, Ticho vigorouſly applied himſelf; and found by many juſt and faithful trials, that it had not a diurnal parallax that was at all perceptible; and conſequently was not only no aereal vapour, but alſo much higher than the moon; nay, might be placed amongſt the planets for any thing that appeared to the contrary; the cavilling oppoſition made by ſome of the ſchool-men in the mean time being to no purpoſe. Next to Ticho came the ſagacious Kepler. He, having the advantage of Ticho's labours and obſervations, found out the true phyſical ſyſtem of the world, and greatly improved the ſcience of aſtronomy. This great aſtronomer had an opportunity of obſerving two comets, one of which was a very remarkable one; and from the obſervations of theſe (which afforded ſufficient indications of an annual parallax) he concluded, that the comets moved freely through the planetary orbs, with a motion not much different from a rectilinear one; but of what kind he could not then preciſely determine. Next Hevelius, (a noble emulator of Ticho Brahe) following Kepler's ſteps, embraced the ſame hypotheſis of the rectilinear motion of comets, himſelf accurately obſerving many of them; yet he complained that his calculations did not perfectly agree to the matter of fact in the heavens; and was aware that the path of a comet was bent into a curve line towards the ſun: at length came that prodigious comet of the year 1680, which deſcending, as it were, from an infinite diſtance perpendicularly towards the ſun, aroſe from him again with as great a velocity. This comet, which was ſeen for four months ſucceſſively, by the very remarkable and peculiar curvity of its orbit, above all others, gave the fitteſt occaſion for inveſtigating the theory of its motion. And the royal obſervatories at Greenwich and Paris, having been for ſome time founded, and committed to the care of moſt excellent aſtronomers, the apparent motion of this comet was moſt accurately, (perhaps as far as human ſkill could extend) obſerved by Mr. Flamſteid and Mr. Caſſin.

Not long after, the illuſtrious Newton, writing his Mathematical Principles of Natural Philoſophy, demonſtrated not only that what Kepler had found did neceſſarily obtain in the planetary ſyſtem; but alſo that all the phænomena of comets would naturally follow from the ſame principles: which he abundantly illuſtrated by the example of the aforeſaid comet of the year 1680, ſhewing at the ſame time a method of delineating the orbits of comets geometrically.

That comets are not aereal vapours, or even formed by exhalations from the ſun and planets, Sir Iſaac Newton has clearly ſhewed; by proving that the comet of 1680, in its paſſage through the ſolar regions, would have been diſſipated had it conſiſted of ſuch: for the heat of the ſun it is allowed is as the denſity of his rays, i. e. reciprocally as the ſquares of the diſtances of places from the ſun: wherefore, ſince the diſtance of that comet in its perihelion, December the 8th, was obſerved to be to the diſtance of the earth from the ſun, nearly as 6 to 1000; the ſun's heat in the comet, at that time, was to his heat with us at Midſummer, as 1000000 to 36, or 28000 to 1. It is found by experiment, that the heat of boiling water is little more than three times the heat of our dry earth, when expoſed to the Midſummer's ſun; and aſſuming the heat of red-hot iron to be about three or four times as great as that of boiling water; he thence concludes, that the heat of the dried earth, or body of the comet in its perihelion, muſt be near 2000 times as great as that of red-hot iron.

Such an immenſe heat once acquired in its perihelion, the comet muſt be a long time in cooling again. The ſame author computes, that a globe of red-hot iron, of the dimenſions of our earth, would ſcarce be cool in 50000 years. If then the comet be ſuppoſed to cool 100 times as faſt as red-hot iron; yet, ſince its heat was 2000 times greater, ſuppoſing it of the bigneſs of the earth, it would not cool in a million of years.

The orbit of the late comet in 1743, tho' vaſtly eccentric, fell conſiderably ſhort of that juſt mentioned; yet it nearly equalled the comet in 1665: for it exceeded the apparent diameter of Venus in apogæo, and approached the ſun's center within ten millions of miles probably. Computing therefore on the ratio of viſible diameters, we may reaſonably conclude that the body of this comet was about the ſize of our earth, and its tail about ſix millions of miles long; (allowing that the comet's diameter ſubtended 80″ and 7000 miles in meaſure) for the tail ſtretched to 20° at leaſt. About the twenty-third of December it probably entered the planetary regions: ſuppoſing then that Venus in perigæo appears under an angle of 84″, and is then twenty millions of miles diſtant, her apparent diameter, if removed to Saturn, would not much exceed two ſeconds; and ſuch the comet ſeemed to be at the time ſpecified. In 50 days time then it moved over a ſpace of 670 millions of miles, or about 13 millions a day; but that motion was not equable, being accelerated in its deſcent to an incredible velocity, by the power of the ſolar attraction: ſo that in the inferior part of its orbit it much exceeded ſix hundred thouſand miles an hour, or ten thouſand miles a minute, a rapidity exceeding even imagination itſelf.

The great ſplendor and lengths of the tails, Sir Iſaac Newton thinks, ariſes from the atmoſpheres of comets: this he argues from that wonderful rarefaction obſerved in our air, at a diſtance from the earth: a cubic inch of common air, at the diſtance of half the earth's diameter, or 4000 miles, would neceſſarily expand itſelf ſo as to fill a ſpace larger than the whole region of the ſtars. Since then the coma, or atmoſphere of a comet is ten times higher than the ſurface of the nucleus, counting from the center thereof; the tail, aſcending much higher, muſt needs be immenſely rare: ſo that it is no wonder the ſtars ſhould be viſible through it. The tails of comets, when accurately obſerved, are found not always to riſe in a direction preciſely oppoſite to the ſun, but to deviate or incline a little from thence towards thoſe parts which the comet has lately left, and not only ſo, but to be bent into a certain curvature, the extremities of the tails deviating from the true oppoſition more in proportion than the other parts; and to be more denſe ſeemingly, and better defined on the convex, than on the concave ſide: and farther, that the longer the tail is, the more ſenſible is the curvature, as being the greateſt at the greateſt diſtance from the body of the comet. Upon theſe accounts, he thinks it evident that the phænomena of the tails of the comets depend on the motion of their heads: for as in the atmoſphere of the earth, the ſmoke of a body aſcends perpendicularly if the body be at reſt, and obliquely if the body be moved any otherwiſe than directly upwards, or downwards; ſo in the heavens, where all the bodies gravitate towards the ſun, ſmoke and vapour muſt aſcend from the ſun, and riſe perpendicular if the body producing the ſmoke be at reſt; and obliquely, if the motion of the body be oblique to the direction the vapour aſcends with: and becauſe the force by which the vapour aſcends is ſtrongeſt near the body of the comet, the obliquity with which it aſcends will be the leaſt near the body, and greater at greater diſtances, and conſequently the body will be incurvated or bent towards thoſe parts the comet leaves: and becauſe the vapour in the preceding ſide is ſomething more recent, that is, has aſcended ſomething more lately, it will be ſomething more denſe on that ſide, and on that account muſt reflect more light as well as be the better defined, the vapour on the other ſide languiſhing by degrees, and vaniſhing out of ſight.

There is one remarkable phænomenon which ſometimes, though very ſeldom, accompanies the paſſage of comets in their orbits, and that is what may be called cometary eclipſes; for when a comet comes in the ſyzigial line of the ſun and the earth, it muſt very much abate the ſolar light, though its viſual diameter may not equal it. But if it ſhould equal or exceed it, and ſuch have made their appearance, if their courſe be not exceedingly rapid, the ſun will be darkened, through a much greater extent of earth, for a much longer duration, and attended with a more remarkable obſcurity, than any circumſtances of a ſolar eclipſe ever can be; ſuch probably might be the Egyptian darkneſs in the Jewiſh hiſtory, that of Jupiter and Alcmena in the Grecian, and of Auguſtus in the Roman; beſides others unrecorded in the annals of hiſtory.

Some comets have their nodes ſo very near the annual orb of the earth, that if the earth ſhould happen to be in that part of its orbit next the node of ſuch a comet, as the comet paſſes by, the apparent motion thereof would become incredibly ſwift, and conſequently its parallax very conſiderable, and the proportion thereof to that of the ſun will then be given: wherefore ſuch tranſits of comets do afford us the very beſt means, though they ſeldom happen, to determine the diſtance of the ſun and earth. Now the comet of 1472 had a parallax above twenty times greater than the ſun's: and if the comet of 1618 had come down, about the middle of March, to his deſcending node; or that of 1684 had arrived a little ſooner at its aſcending node, they would have been yet much nearer the earth, and conſequently have had more notable parallaxes. But hitherto none has threatened the earth with a nearer appulſe than that of 1680: for by calculation, it appears that November 11°. 1ʰ. 6′. P. M. the comet was not above the ſemi-diameter of the ſun to the northwards of the way of the earth: at which time, had the earth been there, the comet would have had a parallax equal to that of the moon. But what might be the conſequences of ſo near an appulſe; or of a contact; or laſtly, of a ſhock of the celeſtial bodies, which is by no means impoſſible to come to paſs, is left to be diſcuſſed by the ſtudious in phyſical matters.

Since it is found by obſervations that the cometary orbits are extremely eccentric, and that the portion which a comet deſcribes, during the time of its appearance, is but a very ſmall part of the whole, the center of ſuch an ellipſis being removed to ſo vaſt a diſtance, muſt occaſion the curvature at each end to be vaſtly near that of a parabola, having the ſame focal diſtance; and conſequently the motion of a comet may be calculated in a parabolic orbit, without any conſiderable error.

Now as comets may be ſuppoſed to move in ſuch orbits, having the ſun in their common focus; and it being well known that all parabolas, cut from ſimilar cones, are ſimilar; it therefore follows, that if any determinate part of the area of a given parabola be divided into any number of parts at liberty, there will be a like diviſion made in all parabolas under the ſame angles, and the diſtances will be proportional. This premiſed, let S (plate XLII. *fig.* 8.) be the ſun, P Q R the orbit of a comet, P the perihelion, R the place where the comet is 90° diſtant from the ſun, Q any other place of the comet; draw Q A perpendicular to the axis, and let *a b* be a tangent to the curve in the point Q, and B Q drawn perpendicular thereto; then by the nature of the parabola we have A B = S R, the *ſemilatus rectum*; and putting the given area P Q S = *a*, and A Q = *x*, we have $\frac{x^3}{12}+\frac{x}{4}=a$, or $x^3+3x=12a$; this cubic equation reſolved, gives the ordinate A Q; and thence we have P A, but P A + P S = S Q = diſtance of the comet from the ſun, which therefore is given. Now in the triangle S A Q, right angled at A, we have S Q and A Q to find the angle Q S A, and then P S Q the angle from the perihelium is known. When this is done, all the other particulars are the ſame as in the planetary calculus.

The velocity of a comet moving in a parabola is every where to the velocity of a planet deſcribing a circle about the ſun, at the ſame diſtance from the ſun, as $\sqrt{2}$ to 1, by cor. 77, prop. 16, lib. 1. of the Principia. If therefore a comet in its perihelium were ſuppoſed to be as far diſtant from the ſun as the earth is, then the diurnal area, which the comet would deſcribe, would be to the diurnal area of the earth, as $\sqrt{2}$ to 1; and conſequently the time of the annual revolution is to the time in which ſuch a comet would deſcribe a quadrant of its orbit from the perihelium, as 3,14159, &c. (that is, the area of the circle) to $\sqrt{\frac{8}{9}}$; therefore the comet would deſcribe that quadrant in 109 days, 14 hours, 46 minutes; and ſo the parabolic area (analogous to the area P R S) being divided into 100 parts, to each day there would be allotted .0,912280, of thoſe parts, whoſe logarithm 9.960128 is to be reſerved for continual uſe: but then the times in which a comet, at a greater or leſs diſtance, would deſcribe ſimilar quadrants, are as the times of the revolutions in circles; that is, in the ſeſquiplicate ratio of the diſtances: and ſo the diurnal areas, eſtimated in hundred parts of the quadrant, (which parts are to be put for meaſures of the mean motion, like degrees) are in each, in the ſubſeſquialtera proportion of the diſtance from the ſun in the perihelion.

Theſe are the principles or elements of calculation, which we ſhall now proceed to illuſtrate by an example of the comet of 1743, whoſe mean anomaly or diurnal area is firſt to be determined.

In order to this we have the conſtant mean motion of a comet moving in a parabola, whoſe perihelion diſtance P S = 1 = ſemi-diameter of the earth's orbit, viz. = $\frac{100}{109\text{ D. }14\text{ H. }46'}$ = 0,912280, as before found. The perihelion diſtance P S of this comet was found to be 0.22206, whence the diurnal area will be obtained thus, either by logarithms or numbers. Take the ſquare root of the cube of the comet's perihelion diſtance, and divide unity thereby, multiply the quotient by the conſtant factor 0,912280, and the product will give the diurnal area required; in this caſe, depending upon the perihelion diſtance 0.22206, we have 8.717 for the ſaid area.

Having thus obtained the diurnal area, if we multiply this by any number of days and decimal parts of a day, it will give the area P R Q S, or mean anomaly for the given time. Thus let it be required for January 23 D. 6 H. 11′.

		D	H	M
Then from the time of the perihelion,	Feb.	19	8	12
Subtract the given time — — —	Jan.	23	6	11
The difference will be — — — —		27	2	1

Wherefore multiplying the diurnal area 8.717, by the time 27.0833, we have 236.1 the mean anomaly required.

Having therefore the area P R Q S = 236.1, we can find A Q = *x*, from the equation $x^3+3x=12a$; for if, when the quadrantal area P S R is 100, we put S R = *x* = 1, then it is plain, $x^3+3x=4=12a$, in that caſe: therefore, when the mean anomaly is but $\frac{1}{100}$ part of this, we have $x^3+3x=\frac{4}{100}=,04$: this will be a conſtant multiplier for reducing any given anomaly to fit it for the equation. Thus $0,04\times236.1=9,444=x^3+3x$ in the preſent caſe, which reſolved according to the uſual methods gives $x=1.65$ nearly.

Then by the nature of the parabola $\frac{AQ^2}{4PS}=AP=1,3612$. Alſo A P + P S = S Q = 1,8612, the diſtance of the comet from the ſun for the given time: but to expreſs this diſtance in the ſame parts, as the ſun's mean diſtance from the earth contains 1,00000, we muſt conſider that the perihelion diſtance P S = 0,22206, whence S R = 0.44412. Wherefore ſay, As 1 : 0.44412 :: 1,8612 : 0,82650, the expreſſion required.

In the right angled triangle Q A S, having all the ſides, we find the angle Q S A = 62°, 36½′, whence the obtuſe angle P S Q = 117° 33½, which is the heliocentric diſtance of the comet from the perihelion. Now ſince the perihelion is in ♎ 17°, 12′, 55″, if we ſubtract 117°, 33′, 30″, we ſhall have the heliocentric longitude in ♉ 19°, 39′, 25″.

Alſo the deſcending node is in ♏ 15°, 45′, 20″, from which ſubtract the comet's place now found, the difference 147°, 05′, 55″, is the diſtance of the comet from the node. Let the lines of the nodes be ☋ S ☊; then, ſince the perihelion P is 151°, 27′, 35″, diſtant from the node ☊, it will be but 28°, 38′, 25″, diſtant from the node ☋. If then from the angle Q S A = 62°, 36′½, we deduct P S ☋ = 28°, 38′, 25″, = A S ☊, we ſhall have Q S ☊ = 30°, 58′, 5″.

From Q let fall the perpendicular Q N on the line of nodes; then in the right angled triangle Q N S, having the angle at S and the ſide S Q, we can find Q N as follows:

As radius — — — — 90° = 10,000000
To the ſine of the angle Q S N 33°, 58′ = 9,747374
So is the ſide — — S Q = 0 82650 = 9,917227
To the length of the ſide Q N = 0,46200 = 9,664601

Again, In the right angled triangle Q N D, we have the ſide now found Q N, and the angle of the inclination of the comet's orbit Q N D = 47°, 9′, to find the ſide or perpendicular Q D. Thus ſay,

As radius — — — — — 9° = 10,000000
Is to the ſine of inclination Q N D = 47°, 9′ = 9,865138
So is the ſide — — Q N = 0,46200 = 9,664601
To the perpendicular — Q D = 0,33860 9,529739

We can now find the heliocentric latitude of the comet, or the angle Q S D; for

As the ſide — — — QS = 0,82650 = 9,917227
Is to the ſide — — QD = 0,33860 = 9,529739
So is radius — — — 90° = 10,000000
To ſine of heliocentric lat. QSD = 24°, 12′ = 9,612512

To find the comet's curtate diſtance from the ſun, viz. SD, we have this analogy from the right angled triangle QSD.

As radius — — — — — 90° = 10,000000
To the ſine of the angle SQD = 65°, 48′ = 9,960052
So is the ſide — — SQ = 082650 = 9,917227
To the curtate diſtance SD = 0.75380 = 9,877279

To find the ſide ND in the right angled triangle QND, ſay

As radius — — — — — 90 = 10,000000
To coſine of inclination DNQ = 42°, 51′ = 9,832616
So is the ſide — — QN = 0,46200 = 9,664601
To the ſide — — DN = 0,31420 = 9,497217

Then in the right angled triangle NSD, we can find the heliocentric place of the comet in the ecliptic, or angle DSN, thus,

As the curtate diſtance SD = 0,75380 = 9,877279
To the ſide — — ND = 0,31420 = 9,497217
So is radius — — — — — 90° = 10,000000
To the ſine of the angle DSN = 24°, 38′ = 9.619935
Therefore to the place of the node ☊, ♉ 15° 45′ 20″
Add the angle now found — — — 24 38 00
The ſum is the helioc. place in the ecliptic 10 23 20

The next thing to be done is to find the place of the ſun, and conſequently of the earth in her orbit for the given time, which is calculated from the tables in the uſual method, as follows:

		Mot. of the Sun					Mot. of Perhilion				
		S	°	′	″		S	°	′	″	
	1741	9	21	1	58	——	3	8	13	30	
	3	11	29	17	00				2	30	
January	23	00	22	40	12					3	
Hours	6			14	47						
Minutes	11				27						
Mean motion		10	13	14	24	——	3	8	16	3	
Equation add			1	7	39		10	13	14	24	
True place		10	14	22	3		7	4	58	23	M.Anom

The ſun's place being found in ♒ 14°, 22′, 03″, the earth's place will be in the oppoſite part of the ecliptic, viz. in ♌ 14°, 22′, 03″, at T. If therefore from this we ſubtract the comet's heliocentric place at H, we ſhall have the arch HT = 63°, 49′, 43″ = DST, the angle of commutation. And as the earth's mean anomaly is 7 S, 4°, 58′, 23″, the logarithm of the earth's diſtance ST will be 9,993947: but SD is alſo known; therefore we can find the angle DTS, or elongation of the comet from the ſun, thus: As the ſum of the ſides ST + SD = 1.74000 is to their difference ST − SD − 0,23240, ſo is the tangent of $\frac{1}{2}$ the ang. $\frac{D+T}{2}$, to the tangent of $\frac{1}{2}$ their difference $\frac{D-T}{2} = 12°, 03′$. Hence 58° + 12°, 03′ = 70°, 03′ = TDS, and 58° − 12°, 03′ = 45°, 57′ = STD, or longitude of the comet from the ſun, which, added to the ſun's place at I, gives the geocentric longitude of the comet at L in ♈ 00°, 19′. And to find the geocentric latitude, or angle DTQ, we have this analogy

As the ſine of commutation TSD = 64°, 00′ = 9,953650
Is to the ſine of elongation STD = 45°, 57′ = 9,856568
So is the tang. of helioc. lat. DSQ = 24°, 12′ = 9,652650
To the tang. of the geoc. lat. DTQ = 19°, 46′ = 9,555568

Having thus ſhewn the general affections of a comet's motion, we ſhall now proceed to ſhew the method of determining the length of their tails from obſervation.

In order to this, let S (*fig.* 9.) repreſent the ſun, C the comet, T the earth, C*e* the comet's tail, draw TS, TC, SC, and T*e* touching the end of the tail, and meeting the line SC produced in E. The place of the ſun and comet being known, the angle TCE is known (for TCE = STC + CST). Alſo the angle of deviation EC*e* is known from obſervation; whence TC*e* is known. Moreover, the angle CT*e* is known alſo by obſervation. Therefore, in the triangle TC*e*, having the two angles TC*e* and CT*e*, and the ſide TC, (from the theory) we can find the ſide C*e*, which is the length of the tail: and this they have found to be 40, 60, and 80 millions of miles.

Draw S*e* cutting the comet's orbit in *d*; then, becauſe the whole motion of a particle from C to *e* may be reſolved into two motions C*d* and E*d*, it is plain, ſince *de* is that directly averſe to the ſun, the comet would have poſſeſſed the point *d*, when the particle at *e* firſt roſe from the nucleus, if the motion had been every where in the direction of S*e*, as the line S*e* kept moving from S*e* to SE.

But ſince this is not the caſe, but the particles move in the oblique direction C*e*; therefore parallel to C*e* draw SF cutting the orbit in D, and join D*e*, then will the compound motion C*e*, ariſing from the progreſſive motion of the comet in the direction CD, and its motion of aſcent in the direction C*e*, give the point D for the comet's place, when firſt the particle at *e* began to aſcend from the nucleus.

Now the time in which the comet deſcribes any given part of its orbit DC, may be found from the theory, and conſequently the time of the aſcent of the tail of a comet from the nucleus to the extremity *e*.

Aſtronomers make uſe of ſeveral methods for inveſtigating the apparent place of a comet, one whereof is the following: They obſerve what two ſtars are directly one on one ſide, and the other on the other; which is done by holding up a thread between the eye and the two ſtars, and extending it in ſuch a manner, as that it ſhall ſeem to croſs each ſtar. then they look out for two other ſtars in a like ſituation, that the comet may appear in a line drawn from one to the other, which are found as before; then they extend a thread upon the celeſtial globe, from one of the two firſt ſtars to the other, and another thread from one of the laſt ſtars to the other: and the point on the globe where the threads croſs, is the apparent place of the comet at the time the obſervation was made. This they do daily, and ſo trace out its apparent courſe in the heavens.

COMETARIUM, a curious machine, exhibiting an idea of the motion of a comet about the ſun.

The ſtructure and rationale of this inſtrument is as follows: When the lid is taken off the box, the internal parts appear as in plate XLII. *fig.* 10. NO and QT are two elliptic wheels turning each other about the foci I and S, by means of a cat-gut ſtring in a groove on their edges, croſſing at K. Theſe oval wheels are fixed on arbors or axes, which paſs through the ſame focus S and I in each; the oval NO is moved by the circular wheel I, fixed alſo upon the ſame axes, but above it upon the bar or long piece GV; which wheel is itſelf moved by another equal wheel G, and that by an endleſs ſcrew turned by a winch on the outſide of the box, all which is evident in the figure.

The perimeter of the oval QT, where it touches that of NO, will have a velocity always proportional to the diſtance from I; that is, in the points K, 4, 3, 2, 1, &c. The velocities will be as the lines IK, I4, I3, I2, I1, &c. which we conſider as levers acting upon and moving the oval QT in thoſe points. Now if the ovals are ſuch that IK, is to SV, or IK, to I*r*, as 6 to 1, then will the point K have ſix times the velocity turned by the lever IK, as the point V will have when it has made $\frac{1}{2}$ a revolution, or is come under the point S, where it is turned by the lever I*s*, than in the ſituation IS.

If we take SP = SK = I*s*, und upon the point *s*, S, *s*, as foci, deſcribe the ellipſis PLIM, that will repreſent the orbit of the comet, or the figure of the groove on the lid of the box, in which a round braſs ball, repreſenting the comet, is made to ſlide along on a piece of wire, called the radius vector, fixed at one end into the top of the arbor at S, where we ſuppoſe the ſun to be, and is accordingly repreſented by a ſilver plate at top.

The place of the comet at P is called the perihelion, as being there neareſt the ſun; as I is its aphelion or point of greateſt diſtance. Since SP = SK, the velocity of the comet will be in the point P equal to that of the point K; and were the comet's aphelion at *s*, its velocity then would be equal to that of the point V, when under *s*, viz. ſix times leſs than before; but ſince the comet's aphelion is at I, and ſince the greater arch deſcribed in the ſame time muſt have a greater velocity, the velocity of the comet at I will be about $\frac{1}{5}$ of that at P.

If the ellipſis on the lid of the box be divided into 100 parts, to ſhew the anomaly of the comet, and about the axis of the wheel G be placed a circle E F, divided into equal parts, repreſenting the years or period of the comet, with a proper index pointing to theſe diviſions, the inſtrument will ſhew the ſeveral particulars relating to the theory of elliptic motions, whether of a planet or comet.

COMITIA, in Roman antiquity, an aſſembly of the people, either in the comitium or campus-martius, for the election of magiſtrates, or conſulting on the important affairs of the republic.

COMITIUM, in Roman antiquity, a large hall in the forum, where the comitia were ordinarily held.

COMMA, among grammarians, a point or character marked thus (,) ſerving to denote a ſhort ſtop, and to divide the members of a period.

Different authors define and uſe this point ſo differently, that it is difficult to aſcertain the preciſe uſe of it. The ordinary doctrine concerning it, conveys no clear or diſtinct idea of it; being thus, that it ſerves to diſtinguiſh nouns, verbs, adverbs, and ſuch diviſions of a period as are not neceſſarily joined together: ſome ſay indeed, that the comma ſerves to diſtinguiſh thoſe members of a period, in each whereof is a verb and the nominative caſe of a verb. Thus, "Tho' nothing ſo much gains upon the affections as an extempore eloquence, which we have conſtantly occaſion for, and are obliged to practiſe every day, we very rarely meet with any who excel in it."

The comma is made uſe of to diſtinguiſh ſeveral nouns, ſubſtantives, adjectives, or verbs, not joined by a conjunction in the ſame member of a period: thus, "Words, looks, geſture, and different tones of voice, are the means by which mankind communicate their thoughts to each other;" or, "A man never becomes agreeable in converſation, but by ſtudying the taſte, reſpecting the character, conforming himſelf to the humour, &c. of thoſe he converſes with"

But the comma is omitted when thoſe words are united by a conjunction; as, "Good humour and good ſenſe ſeldom fail to make a man agreeable in converſation."

Comma, in muſic, an interval equal to the difference of the tone major and minor, and expreſſed by the ratio 81 : 80. See the articles Interval and Tone.

COMMAND, in the royal navy, implies the rank and power of an officer who has the management of a ſhip of war under twenty guns, called a ſloop, alſo that of an armed ſhip or bomb-veſſel, whence ,

COMMANDER is an officer who governs a ſloop of war, armed ſhip, or bomb ketch, and who has the rank of major in the army.

COMMANDING Ground, in the military art, an eminence overlooking any poſt or ſtrong place.

A commanding ground is of three kinds: firſt, a front ground, being an height, oppoſite to the face of ſome poſt, which plays upon its front. Secondly, a reverſe ground, being an eminence that can play upon the back of any poſt. Thirdly, an enfilade commanding ground, or curtain commanding ground, being an eminence that, with its ſhot, can ſcour all the length of a ſtraight line.

COMMANDMENT, in a legal ſenſe, is uſed variouſly: ſometimes it is taken for the commandment of the king; as when, upon his own motion, and from his own mouth, he orders any perſon to priſon. Sometimes it is uſed for the commandment of the juſtices: this commandment is either abſolute, or ordinary: abſolute is when a juſtice commits a perſon to priſon for contempt, &c. upon his own authority, as a puniſhment: ordinary is where a juſtice commits a perſon rather for ſafe cuſtody than for puniſhment; the perſon thus committed by ordinary commandment is bailable. In another ſenſe of the word, magiſtrates may command others to aſſiſt them in the execution of their offices, in order to keep the king's peace, &c.

Commandment is likewiſe uſed for the offence of a perſon that wills or orders another to do ſome unlawful act, as theft, murder, or the like To command any one to commit burglary, is felony excluded clergy; and he who commands the doing any act that is unlawful, is acceſſary to it and all the conſequences thereof, if executed in the ſame manner as commanded; though not where it varies, or where the commander revokes the command. In treſpaſſes, &c a maſter ſhall be charged with the acts of his ſervant done by his command: however, ſervants ſhall not be excuſed for committing any crime when they act by command of their maſters, who have no ſuch power over them as to enforce ſuch commandments. The commands of infants or feme coverts are void.

COMMANDRY, a ſort of benefice, or certain revenue, belonging to a military order, and conferred on ancient knights, who had done ſervices to the order, as the commandries of Malta.

COMMENDAM, in the eccleſiaſtical law, the truſt or adminiſtration of the revenues of a benefice, given either to a layman, to hold, by way of depoſitum, for ſix months, in order to repairs, &c. or to an eccleſiaſtic, or beneficed perſon, to perform the paſtoral duties thereof, till once the benefice is provided with a regular incumbent.

COMMENSURABLE, among geometricians, an appellation given to ſuch quantities as are meaſured by one and the ſame common meaſure: thus if the line

A |—|—|—|—|—|—|—|—| *a* be equal to 8, and the line B |—|—|—|—| *b* equal to 4 inches, theſe two lines will be commenſurable, ſince the ſame common meaſure 2 meaſures them both.

Commensurable Numbers, whether integers or fractions, are ſuch as can be meaſured or divided by ſome other number, without any remainder: ſuch are 12 and 18, as being meaſured by 6 or 3.

Commensurable *in Power* is ſaid of right lines when their ſquares are meaſured by one and the ſame ſpace or ſuperficies.

Commensurable Surds, thoſe that being reduced to their leaſt terms, become true figurative quantities of their kind, and are therefore as a rational quantity to a rational one.

COMMENTARY, or Comment, in matters of literature, an illuſtration of the difficult or obſcure paſſages of an author.

Commentary, or Commentaries, likewiſe denotes a kind of hiſtory or memoirs of certain tranſactions, wherein the author had a conſiderable hand: ſuch are the Commentaries of Cæſar.

COMMERCE, a term uſed for the buying, ſelling, or bartering of all manner of commodities, in order to profit by the ſame.

COMMINATORY, an appellation given to whatever threatens puniſhment, or ſome penalty: ſuch is that part of a felon's ſentence of baniſhment, which makes it death if he return before a certain time.

COMMINUTION denotes the breaking, or rather grinding, a body into very ſmall particles.

COMMISSARY, in the eccleſiaſtical law, an officer of the biſhop, who exerciſes ſpiritual juriſdiction in places of a dioceſe ſo far from the epiſcopal ſee, that the chancellor cannot call the people to the biſhop's principal conſiſtory court, without giving them too much inconveniency.

Commissary, in a military ſenſe, is of three ſorts.

Commissary *General of the Muſters*, an officer appointed to muſter the army as often as the general thinks proper, in order to know the ſtrength of each regiment and company, to receive and inſpect the muſter-rolls, and to keep an exact ſtate of the ſtrength of the army.

Commissary *General of Stores*, an officer in the artillery, who has the charge of all the ſtores, for which he is accountable to the office of ordnance.

Commissary *General of Proviſions*, an officer who has the inſpection of the bread and proviſions of the army.

COMMISSION, in common law, the warrant or letters-patent which all perſons, exerciſing juriſdiction, have to empower them to hear or determine any cauſe or ſuit; as the commiſſion of the judges, &c.

COMMISSIONER *of the Navy*. See the article Navy.

Commissioner, a perſon authorized by commiſſion, letters-patent, or other lawful warrant, to examine any matters, or execute any public office, &c.

COMMISSURE, in architecture, &c. the joint of two ſtones, or the application of the ſide of one to that of the other.

COMMITMENT, in law, the ſending of a perſon, charged with ſome crime, to priſon, by warrant, or order.

COMMITTEE, one or more perſons to whom the conſideration or ordering of a matter is referred, either by ſome court, or by the conſent of parties, to whom it belongs.

Committee *of Parliament*, a certain number of members appointed by the houſe for the examination of a bill, making report of an inquiry, proceſs of the houſe, &c.

COMMODITY, in a general ſenſe, denotes all ſorts of wares and merchandiſes whatſoever, that a perſon deals or trades in.

Staple Commodities, ſuch wares and merchandiſes as are commonly and readily ſold in a market, or exported abroad; being, for the moſt part, the proper produce or manufacture of the country.

COMMODORE, in the royal navy, an officer who commands a fleet or ſquadron of ſhips of war, and is diſtinguiſhed by wearing a broad pendant, i. e. a ſmall red flag which tapers to a point: the office of commodore is only inveſted in a captain of the navy for a certain time, during which he has the rank of brigadier-general, of which, at the expiration of ſuch office, he is deprived. In time of war theſe officers, who are always captains in the navy, are directed to ſuperintend the operations of a ſquadron by their ſeniority or ſuperior abilities; but in peace, their abilities are rarely queſtioned, provided they have ſufficient intereſt.

COMMON, ſomething that belongs to all alike, in contradiſtinction to proper, peculiar, &c. Thus the earth is ſaid to be our common mother.

Common Law, that body of rules received as law in England, before any ſtatute was enacted in parliament to alter the ſame.

Common-Place Book, *Adverſaria*, among the learned, denotes a regiſter of what things occur worthy to be noted in the courſe of a man's ſtudy, ſo diſpoſed, as that among a number of ſubjects, any one may be eaſily found. Several perſons have their ſeveral methods of ordering them; but that which is beſt recommended, is Mr. Locke's method, which he has publiſhed in a letter to Mr. Toiſnard, determined thereto by the great conveniency and advantage he had found from it in twenty years experience.

Dr. Felton, in his Introduction to the Claſſics, ridicules the practice of common-placing, with more wit, however, we think, than argument; for if a common-place book be well contrived, if the paſſages taken down are diſperſed in a regular manner, the expedient muſt certainly be of great ſervice. Few readers are capable of remembering all the beautiful ſentiments and reflections that are to be met with in an author; a common-place book, therefore, is a repoſitory, where fine obſervations upon all ſubjects are ſo ranged, that the reader may have recourſe to them on all occaſions.

Common-Pleas is one of the king's courts now held conſtantly in Weſtminſter-Hall, but anciently was moveable.

Common, in law, that ſoil, the uſe of which is common to this or that town or lordſhip.

Common Prayer is the liturgy in the church of England.

Common, in grammar, denotes the gender of nouns which are equally applicable to both ſexes: thus *parens*, a parent, is of the common gender.

Common, in geometry, is applied to an angle, line, or the like, which belongs equally to two figures.

COMMONS, or *Houſe of* Commons, a denomination given to the lower houſe of parliament. See Parliament.

Commons, or Commonalty, likewiſe ſignifies the whole body of the people under the degree of a baron, whether knights, gentlemen, burgeſſes, yeomen, &c.

COMMONWEALTH, the ſame with republic. See the article Republic.

COMMOTION, an inteſtine motion in the parts of any thing.

COMMUNICATION, in a general ſenſe, the act of imparting ſomething to another.

Communication is alſo uſed for the connection of one thing with another, or the paſſage from one place to another: thus a gallery is a communication between two apartments.

Communication *of Idioms*, in theology, the act of imparting the attributes of one of the natures in Jeſus Chriſt to the other.

It is by this communication that we ſay, God ſuffered, and died, &c. which, ſtrictly ſpeaking, is only underſtood of the human nature; and is wholly founded on the union of the two natures in the perſon of Chriſt.

The Lutherans carry the communication of idioms ſo far as to ſay, that Jeſus Chriſt is not only in his divine nature, and by reaſon of his divine perſon, but alſo, really and properly, in his humanity, immortal, immenſe, &c.

Communication *of Motion*, in philoſophy, is the action of a moving body, whereby a body at reſt is put in motion, or a body already in motion is accelerated.

The Laws of Communication of Motion. Sir Iſaac Newton demonſtrates, that action and re-action are equal and oppoſite; ſo that one body ſtriking againſt another, and thereby occaſioning a change in its motion, does in itſelf undergo the ſame change in its own motion, the contrary way.

Hence a moving body ſtriking directly againſt another at reſt, the one loſes juſt as much of its motion as it communicates to the other, and they will proceed with the ſame velocity as if grown into one maſs.

Therefore, if the body in motion be triple that at reſt, againſt which it ſtrikes, it will loſe a fourth part of its motion; and whereas, before it would run over, (v. g.) a line of 20 feet, in a given time, it will now only run over 15; that is, it will loſe a fourth part of its velocity.

If a moving body ſtrike another already in motion, the firſt will augment the velocity of the latter, but will loſe leſs of its motion than if the latter had been abſolutely at reſt.

Thus, v. g. if a body in motion be triple of another at reſt, and ſtrike againſt it with 32 degrees of motion, it will communicate 8 degrees of its motion to the other, and retain 24 to itſelf. If the other had already 4 degrees of motion, the firſt would only communicate 5, and retain 27; ſince thoſe 5 were ſufficient, in regard to the inequality of the bodies, to make them proceed with equal velocity.

After the ſame manner may be determined the other laws of communication in bodies perfectly hard, and void of all elaſticity. But all hard bodies, that we know of, have an elaſtic power, and the laws are different and much more intricate in elaſtic bodies.

If a body happen to decline out of the way, when moved by another, ſo as to leave a free paſſage to the body by which it was moved; yet that will only proceed with the velocity which it had after its communication with the other, not with that it had before. It being a rule that every thing endeavours to perſevere, not in the ſtate wherein it was formerly, but in that wherein it was at that juncture: therefore, a body that has already loſt part of its motion by its meeting with another, may ſtill loſe more by a ſecond and a third, ſo as at length to become perfectly at reſt.

Hence, firſt, if two unequal homogeneous bodies move in a right line with the ſame velocity, the greater muſt preſerve its motion longer than the ſmaller; for the motions of bodies are as their maſſes, but each communicates of its motion to the circumjacent bodies which touch the ſurface; the largeſt body therefore, though it has more ſurface than the ſmaller, yet, having leſs in proportion to its maſs or quantity of matter than the ſmaller, will loſe a leſs portion of its velocity every moment than the ſmaller.

As for example, ſuppoſe a cube A to be two feet every way, and another B, one foot, the ſurfaces here will be as 4 to 1, but their maſſes as 8 to 1. If therefore thoſe bodies move with the ſame velocity, the cube A will have 8 times as much motion as the cube B, the quantity of motion ever being as the quantity of matter; that each of them therefore may become quieſcent at the ſame time, the cube A muſt loſe 8 times as much motion as the cube B; but that is impoſſible; becauſe, as their ſurfaces are to each other as 4 to 1, the bodies againſt which they ſtrike will be only as 4 to 1. Therefore, when the cube B is become perfectly quieſcent, A will retain half its motion.

Hence, ſecondly, we ſee the reaſon, why any long body, as a dart thrown longwiſe, continues its motion longer than when thrown tranſverſely, it meeting fewer bodies in the way to communicate its motion to in the one caſe than in the other.

Hence alſo, thirdly, if a body be moved almoſt wholly within itſelf, ſo as to communicate little of its motion to the ambient bodies, it muſt continue its motion a long time: thus, a ſmooth braſs ball of half a foot diameter, placed on a ſlender ſmooth axis, with a very weak impulſe is found to revolve for the ſpace of 3 or 4 hours.

Bridge of Communication. See the article Bridge.

Lines of Communication, in military matters, trenches made to continue and preſerve a ſafe correſpondence between two forts or poſts; or at a ſiege, between two approaches, that they may relieve one another.

COMMUNION, in matters of religion, the being united in doctrine and diſcipline; in which ſenſe of the word, different churches are ſaid to hold communion with each other.

Communion is alſo uſed for the act of communicating in the ſacrament of the euchariſt, or the Lord's-ſupper.

Communion-Service, in the liturgy of the church of England, the office for the adminiſtration of the holy ſacrament, extracted from ſeveral ancient liturgies, as thoſe of St. Baſil, St. Ambroſe, &c.

Communion-Table, that whereon the elements of bread and wine, uſed in communicating, or partaking of the Holy Sacrament, are placed.

COMMUNITY, a ſociety of men living in the ſame place, under the ſame laws, the ſame regulations, and the ſame cuſtoms.

COMMUTATION, in aſtronomy. The angle of commutation is the diſtance between the ſun's true place ſeen from the earth, and the place of a planet, reduced to the ecliptic. It is found by ſubtracting the ſun's true place from the heliocentric place of the planet. See *Heliocentric* Place.

Commutation, in law, the change of a penalty or puniſhment from a greater to a leſs; as when death is commuted for baniſhment, &c.

COMPACT, in phyſiology, is ſaid of bodies which are of a cloſe, denſe, and heavy texture, with few pores, and they very ſmall.

Compact is alſo the name of a famous bull confirmed by pope Paul IV. by virtue of which cardinals are reſtricted to confer benefices in their natural ſtate; that is, regular benefices on regulars, &c.

COMPANY, in general, denotes a number of people met together in the ſame place, and about the ſame deſign. With reſpect, however, to matters of pleaſure or diverſion, inſtead of company, we make uſe of the terms party, or match.

Company, in a commercial ſenſe, is a ſociety of merchants, mechanics, or other traders, joined together in one common intereſt.

Company, in military affairs, a ſmall body of foot, commanded by a captain, who has under him a lieutenant and enſign.

The number of centinels, or private ſoldiers in a company, may be from 50 to 80; and a battalion conſiſts of thirteen ſuch companies, one of which is always grenadiers, and poſted on the right: next them ſtand the eldeſt company, and on the left the ſecond company; the youngeſt one being always poſted in the center.

Companies not incorporated into regiments are called irregulars, or independent companies.

Rule of Company, in arithmetic, the ſame with fellowſhip. See Fellowship.

COMPARATES, *Comparata*, among logicians, denote the terms of a compariſon, or the ſubjects compared to each other. See the article Comparison.

COMPARATIVE, in general, denotes ſomething that is compared to another. Thus,

Comparative Anatomy, is that branch of anatomy which conſiders the ſecondary objects, or the bodies of other animals; ſerving for the more accurate diſtinctions of ſeveral parts, and ſupplying the defect of human ſubjects.

It is otherwiſe called the anatomy of beaſts, and ſometimes zootomy; and ſtands in contradiſtinction to human anatomy, or that branch of the art which conſiders the human body, the primary object of anatomy. See Anatomy.

Comparative Degree, among grammarians, that between the poſitive and ſuperlative degrees, expreſſing any particular quality above or beneath the level of another.

COMPARISON, in a general ſenſe, the conſideration of the relation between two perſons or things, when oppoſed and ſet againſt each other, by which we judge of their agreement or difference, and find out wherein the one has the advantage of the other.

Comparison *of Ideas*, among logicians, that operation of the mind whereby it compares its ideas one with another, in regard of extent, degree, time, place, or any other circumſtance, and is the ground of relations. This is a faculty which the brutes ſeem not to have in any great degree. See Idea and Relation.

Comparison, in grammar, the inflection of the comparative degree. See the article Comparative.

Comparison, in rhetoric, a figure that illuſtrates and ſets off one thing, by reſembling and comparing it with another, to which it bears a manifeſt relation and reſemblance, as the following figure in Shakeſpear.

> " She never told her love,
> " But let Concealment, like a worm in th' bud,
> " Feed on her damaſk cheek: She pined in thought,
> " And ſat, like Patience on a monument,
> " Smiling at Grief."

COMPARTITION, in architecture, denotes the uſeful and graceful diſpoſition of the whole ground-plot of an edifice, into rooms of office, and of reception or entertainment.

COMPARTMENT, or Compartiment, in general, is a deſign compoſed of ſeveral different figures, diſpoſed with ſymmetry, to adorn a parterre, a ceiling, &c.

A compartment of tiles, or bricks, is an arrangement of them, of different colours, and varniſhed for the decoration of a building. Compartments, in gardening, are an aſſemblage of beds, plats, borders, walks, &c. diſpoſed in the moſt advantageous manner that the ground will admit of. Compartments, in heraldry, are otherwiſe called partitions. See the article Partition.

COMPASS, or *Mariners* Compass, an inſtrument whereby the ſhip's courſe is determined.

This inſtrument, which is a repreſentation of the horizon, is a circle divided into 32 equal parts, by right lines drawn from the center to the circumference, called points, or rumbs, being alſo divided into 360 equal parts, or degrees; and conſequently the diſtance between, or angle formed by, any two rumbs, is equal to 11°, 15'. The four principal of theſe rumbs are called the cardinal points, and take their names from the places to which they tend, viz. that which extends itſelf under the meridian, pointing towards the north, is called north; and its oppoſite one, pointing towards the ſouth, is called ſouth; that which is towards the right-hand, the face being directed north, is termed eaſt; and its oppoſite, weſt. The names of the others are compounded of thoſe, according to their ſituation.

The compaſs being of the utmoſt conſequence to navigation, it is reaſonable to expect that the greateſt attention ſhould be uſed in its conſtruction, and every attempt to improve it carefully examined, and, if proper, adopted. But ſo careleſs are the generality of commanders of this moſt uſeful inſtrument, that almoſt all the compaſſes uſed on board merchant-ſhips have their needles formed of two pieces of ſteel wire, each of which is bent in the middle, ſo as to form an obtuſe angle; and their ends, being applied together, make an acute one; ſo that the whole repreſents the form of a lozenge; in the center of which, and of the card, is placed the braſs cap. Now, if we examine a number of theſe cards, we ſhall rarely, if ever, find them all in the ſame direction, but they will all vary more or leſs, not only with regard to the true direction, but from one another.

Theſe irregularities are owing to the ſtructure of the needle; for the wires of which it is compoſed are only hardened at the ends; now, if theſe ends are not equally hard, or if one end be hardened up higher than the other, when they come to be put together, in fixing them to the card, that end which is hardeſt will deſtroy much of the virtue of the other; by which means the hardeſt end will have the moſt power in directing the card, and conſequently make it vary toward its own direction: and, as the wires are diſpoſed in the form of a lozenge, theſe cards can have but little force, ſo that they will often, when drawn aſide, ſtand at the diſtance of ſeveral degrees on either ſide the point from whence they are drawn: for all magnetical bodies receive an additional ſtrength by being placed in the direction of the earth's magnetiſm, and act proportionably leſs vigorouſly when turned out of it: wherefore, when theſe kind of needles are drawn aſide from their true point, two of the parallel ſides of the lozenge will conſpire, more directly than before, with the earth's magnetiſm; and the other two will be leſs in that direction: by which means the two ſides will very much impede its return; and the two latter will have that impediment to overcome, as well as the friction, by their own force alone.

To remove theſe inconveniencies, ſome needles are made of one piece of ſteel, of a ſpring temper, and broad towards the ends, but tapering towards the middle, where a hole is made to receive the cap. At the ends they terminate in an angle, greater or leſs, according to the ſkill or fancy of the workman. Theſe needles, though infinitely preferable to the other, are, however, far from being perfect; for every needle of this form hath ſix poles inſtead of two, one at each end, two where it becomes tapering, and two at the hole in the middle: this is owing to their ſhape; for the middle part being very ſlender, it has not ſubſtance enough to conduct the magnetic ſtream quite through, from one end to the other: all theſe poles appear very diſtinctly, when examined with a glaſs that is ſprinkled over with magnetic ſand. This circumſtance, however, does not hinder the needle from pointing true; but as it has leſs force to move the card than when the magnetic ſtream moves in large curves from one end to the other, it is certainly an imperfection.

Theſe inconveniencies induced the ingenious Dr Knight to contrive a new ſea-compaſs, which is now uſed on board all the ſhips of war. The needle in this inſtrument is quite ſtraight, and ſquare at the ends; and conſequently has only two poles, though about the hole in the middle, the curves are a little confuſed. Needles of this conſtruction, after vibrating a long time, will always point exactly in the ſame direction; and if drawn ever ſo little on one ſide, will return to it again, without any ſenſible difference. We may therefore conclude, that a regular parallelopiped is the beſt form for a needle, as well as the ſimpleſt, the holes for the caps being as ſmall as poſſible.

And as the weight ſhould be removed to the greateſt diſtance from the center of motion, a circle of braſs, of the ſame diameter of the card, may be added, which will ſerve alſo to ſupport the card, which may then be made of thin paper, without any thing to ſtiffen it. This ring being fixed below the card, and the needle above it, the center of gravity is placed low enough to admit of the cap being put under the needle, whereby the hole in the needle becomes unneceſſary.

In order to render the above inſtructions more plain and eaſy to be underſtood, we have given a view of the ſeveral parts (plate XXXVII.) where *fig.* 13. is the card, with the needle K L, and its cap M, fixed upon it, being one third of the diameter of the real card.

Fig. 14, is a perſpective view of the backſide of the card, where A B repreſents the turning down of the braſs edge, C the under part of the cap, D and E two ſliding weights to balance the card, and F, G, two ſcrews that fix the braſs edge, &c. to the needle.

Fig. 12, is the pedeſtal that ſupports the card, containing a ſewing-needle, fixed in two ſmall grooves to receive it, by means of the collet C, in the manner of a portcrayon. D, the ſtem, is filed into an octagon, that it may be the more eaſily unſcrewed.

Azimuth COMPASS. See the article AZIMUTH *Compaſs*.

COMPASS DIALS, are ſmall horizontal dials, fitted in braſs or ſilver boxes, for the pocket, to ſhew the hour of the day, by the direction of a needle, that indicates how to place them right, by turning the dial about till the cock or ſtyle ſtand directly over the needle, and point to the northward: but theſe can never be very exact, becauſe of the variations of the needle itſelf.

COMPASS-SAW. See the article SAW.

COMPASSES, or *Pair of* COMPASSES, a mathematical inſtrument for deſcribing circles, meaſuring figures, &c.

The principal perfection of this, as of all other compaſſes, conſiſts in the eaſy and uniform opening and ſhutting of their legs; one of which may be taken out in order to make room for others.

There are now uſed compaſſes of various kinds and contrivances, accommodated to the various uſes they are intended for; as,

COMPASSES *of three Legs* are, ſetting aſide the exceſs of a leg, of the ſame ſtructure with the common ones: their uſe being to take three points at once, and ſo to form triangles; to lay down three poſitions of a map, to be copied at once, &c.

Beam COMPASSES conſiſt of a long branch, or beam, carrying two braſs curſors, the one fixed at one end, the other ſliding along the beam, with a ſcrew to faſten it on occaſion.

To the curſors may be ſcrewed points of any kind, whether ſteel, for pencils, or the like. It is uſed to draw large circles, to take great extents, &c.

Caliber COMPASSES. See CALIBER.

Clockmaker's COMPASSES are joined like the common compaſſes, with a quadrant, or bow, like the ſpring compaſſes; only of different uſe, ſerving here to keep the inſtrument firm at any opening. They are made very ſtrong, with the points of their legs of well tempered ſteel, as being uſed to draw lines on paſte-board or copper.

Cylindrical and Spherical COMPASSES, conſiſt of four branches, joined in a center, two of which are circular, and two flat, a little bent on the ends: their uſe is to take the diameter, thickneſs, or caliber, of round or cylindric bodies; ſuch as cannons, pipes, &c.

For the method of uſing them, ſee the article CALIBER *Compaſſes*.

Elliptic COMPASSES conſiſt of a croſs A B G H, (plate XLII. *fig.* 11.) with grooves in it, and an index C E, which is faſtened to the croſs by means of dove-tails at the points C D, that ſlide in the grooves; ſo that when the index is turned about, the end E will deſcribe an ellipſis, which is the uſe of theſe compaſſes.

German COMPASSES have their legs a little bent outwards, towards the top; ſo that when ſhut, the points only meet.

Lapidary's COMPASSES are a piece of wood, in form of the ſhaft of a plane, cleft at top, as far as half its length: with this they meaſure the angles, &c. of jewels and precious ſtones, as they cut them.

There is in the cleft a little braſs rule, faſtened there at one end by a pin; but ſo that it may be moved in the manner of a braſs level: with this kind of ſquare they take the angles of the ſtones, laying them on the ſhaft as they cut them.

Proportional COMPASSES are ſuch as have two legs, but four points, which, when opened, are like a croſs, as not having the joint at the end of the legs like common compaſſes: ſome of theſe have fixed joints, others moveable ones; upon the legs of the latter of which are drawn the lines of chords, ſines, tangents, &c.

Their uſe is to divide lines and circles into equal parts;

or to perform the operations of the ſector at one opening of them.

Spring Compasses, or Dividers, thoſe with an arched head, which by its ſpring opens the legs; the opening being directed by a circular ſcrew, faſtened to one leg, and let through the other, worked with a nut. Theſe compaſſes are made of hardened ſteel.

Triſecting Compasses conſiſt of two central rules, and an arch of a circle of 120 degrees, immoveable, with its radius, which is faſtened with one of the central rules, like the two legs of a ſector, that the central rule may be carried through all the points of the circumference of the arch. The radius and rule ſhould be as thin as poſſible; and the rule faſtened to the radius ſhould be hammered cold, to attain the greater elaſticity; and the breadth of the central rule ſhould be triple that of the radius: there muſt be alſo a groove in this rule, with a dove-tail, faſtened on it for its motion, and a hole in the center of each rule. The uſe of this inſtrument is to facilitate the triſection of angles geometrically: and it is ſaid to have been invented by M. Tarragen for that purpoſe.

Turn up Compasses. The body of this inſtrument is like the common compaſſes; but towards the bottom of the legs, without ſide, are added two other points, beſides the uſual ones: the one whereof carry a drawing pen-point, the other a port-crayon, both adjuſted ſo as to turn round, and ſo be in the way of uſe, or out of it, as occaſion requires. Theſe compaſſes have been contrived in order to ſave the trouble of changing the points.

COMPENDIUM, in matters of literature, denotes much the ſame with epitome, or abridgement. See Abridgment.

COMPENSATION, in a general ſenſe, an action whereby any thing is admitted as an equivalent to another.

Compensation, in the civil law, a ſort of right, whereby a debtor, ſued by his creditor for the payment of a debt, demands that the debt may be compenſated with what is owing him by the creditor, which in that caſe is equivalent to payment.

COMPLAINANT, in law, the ſame with plaintiff. See the article Plaintiff.

COMPLEMENT, in aſtronomy, the diſtance of a ſtar from the zenith; or the arch comprehended between the place of the ſtar above the horizon and the zenith.

Complement, in geometry, is what remains of a quadrant of a circle, or of 90°, after any certain arch has been taken away from it. Thus, if the arch taken away be 40°, its complement is 50; becauſe $50+40=90$. The ſine of the complement of an arch is called the coſine, and that of the tangent, the co-tangent, &c.

Complement *of the Courſe*, in navigation, is the number of points the courſe wants of 90°, or eight points, viz. of a quarter of the compaſs. See the article Course.

Complement *of the Curtin*, in fortification, is that part of it which makes the demigorge. See the articles Curtin and Demigorge.

Complement *of the Line of Defence*, is the remainder of the line of defence, after the angle of the flank is taken off. See the articles Angle and Defence.

Complements *in a Parallelogram*, are the two ſmaller parallelograms GAE, FCE, (plate XLII. *fig.* 12.) made by drawing two right lines GE, and FE, through the point E, in the diagonal; and parallel to the ſides AB, BC, of a parallelogram ABCD.

COMPLEX *Ideas*, in logic, are ſuch as are compounded of ſeveral ſimple ones. See the articles Term and Idea.

Complex *Propoſition* is either that which has at leaſt one of its terms complex, or ſuch as contains ſeveral members, as caſual propoſitions: or it is ſeveral ideas offering themſelves to our thoughts at once, whereby we are led to affirm the ſame thing of different objects, or different things of the ſame object. Thus, *God is infinitely wiſe, and infinitely powerful.* In like manner, in the propoſition, *Neither kings nor people are exempt from death.*

Complex *Term*, in logic, is that which requires more than one word to ſignify one thing; or where one word implies ſeveral things.

Some terms are complex in words, but not in ſenſe, ſuch is the ſecond emperor of Rome; for it excites in our mind only the idea of one man, viz. Auguſtus.

Some terms are complex in ſenſe, but not in words; ſo when we ſay an army, a foreſt, we mean a multitude of men, or trees; and almoſt all our moral ideas, as well as many of our natural ones, are expreſſed in this manner; religion, piety, loyalty, knavery, theft, include a variety of ideas in each term.

There are other terms which are complex both in words and ſenſe; ſo when we ſay, a fierce dog, or a pious man, it excites an idea, not only of thoſe two creatures, but of their peculiar characters alſo.

Among the terms that are complex in ſenſe, but not in words, we may reckon thoſe ſimple terms which contain a primary and a ſecondary idea in them; as when we hear our neighbour ſpeak that which is not true, we ſay to him, this is not true, or this is falſe, we only convey to him the naked idea of his error; this is the primary idea: but if we ſay it is a lye, the word lye carries alſo a ſecondary idea in it, for it implies both the falſhood of the ſpeech, and our reproach and cenſure of the ſpeaker. On the other hand, if we ſay it is a miſtake, this carries alſo a ſecondary idea with it; for it not only refers to the falſhood of his ſpeech, but includes our tenderneſs and civility to him at the ſame time. Another inſtance may be this; when we uſe the word inceſt, adultery, and murder, we convey to another not only the primary idea of thoſe actions, but we include alſo the ſecondary idea of their unlawfulneſs, and our abhorrence of them.

COMPLEXION, *Complexio*, among phyſicians, the temperament, habitude, and natural diſpoſition of the body, but more often the colour of the face and ſkin.

Complexion, in metaphyſics, the union or coalition of ſeveral things different from each other, either really or imaginary.

COMPLEXUS, in anatomy, a broad and pretty long muſcle, lying along the back-part and ſide of the neck: it is fixed below to the vertebræ of the neck, and above to the upper tranſverſe line of the os occipitis. There is one of theſe on each ſide; and both acting togther, they pull the head directly backwards; whereas, if only one acts, it draws the head obliquely back.

Complexus Minor, in anatomy, a narrow, long, and ſlender muſcle, lying along the inſide of the neck, and otherwiſe called maſtoidæus lateralis. See the article Muscles.

COMPLICATION, in general, denotes the blending, or rather interweaving, of ſeveral different things together: thus a perſon afflicted with ſeveral diſorders at the ſame time, is ſaid to labour under a complication of diſeaſes.

COMPONED, Compone, or Gobony, in heraldry, is ſaid of a bordure made up of angular parts, or chequers, of two different colours.

COMPOSITE, in general, denotes ſomething compounded, or made up of ſeveral others united together. Thus,

Composite Numbers are ſuch as can be meaſured exactly by a number exceeding unity; as 6 by 2 or 3, or 10 by 5, &c. ſo that 4 is the loweſt compoſite number. Compoſite numbers, between themſelves, are thoſe which have ſome common meaſure beſides unity; as 12 and 15, as being both meaſured by 3.

Composite Order, in architecture, the laſt of the five orders of columns; ſo called becauſe its capital is compoſed out of thoſe of the other columns, borrowing a quarter-round from the Tuſcan and Doric, a row of leaves from the Corinthian, and volutes from the Ionic. Its corniche has ſimple modillions or dentils. It is alſo called the Roman or Italic order, as having been invented by the Romans. By moſt authors it is ranked after the Corinthian, either as being the next richeſt, or the laſt invented.

Scamozzi, and after him M. le Clerc, make the column of this order nineteen modules and a half, being leſs by half a module than that of the Corinthian, as in effect the order is leſs delicate than the Corinthian. Vignola makes it twenty, which is the ſame with that of his Corinthian: but Serlio, who firſt formed it into an order by giving it a proper entablature and baſe, and after him M. Perrault, raiſe it ſtill higher than the Corinthian. See plate XLIII.

M. Perrault, in his Vitruvius, makes a diſtinction between the compoſite and compoſed order. The latter, he ſays, is any compoſition, whoſe parts and ornaments are extraordinary and unuſual; but have, withal, ſomewhat of beauty, both on account of their novelty, and in reſpect of the manner or genius of the architect: ſo that a compoſed order is an arbitrary, humorous compoſition, whether regular, or irregular.

For the parts of this order, ſee the articles Base, Capital, Column, Entablature, Frieze, Pedestal, &c.

COMPOSITION, *Compoſitio*, in a general ſenſe, the uniting or putting together ſeveral things, ſo as to form one whole, called a compound.

Composition *of Ideas*, an act of the mind, whereby it unites ſeveral ſimple ideas into one conception, or complex idea.

When we are provided with a ſufficient ſtock of ſimple ideas, and have, by habit and uſe, rendered them familiar to our minds, they become the component parts of other ideas, ſtill more complicated; and form, what we may call, a ſecond order of compound notions. This proceſs, as is evident, may be continued to any degree of compoſition we pleaſe, mounting from one ſtage to another, and enlarging the number of combinations.

Composition, in grammar, the joining of two words together; or prefixing a particle to another word, to augment, diminiſh, or change its ſignification. See the article Word

Composition, in logic, a method of reaſoning, whereby we proceed from ſome general ſelf-evident truth, to other particular and ſingular ones.

In diſpoſing and putting together our thoughts, there are two ways of proceeding, equally within our choice: for we may ſo propoſe the truths, relating to any part of knowledge, as they preſented themſelves to the mind, in the manner of inveſtigation; carrying on the ſeries of proofs in a reverſe order, till they, at laſt, terminate in firſt principles; or beginning with theſe principles we may take the contrary way, and from thence deduce, by a direct train of reaſoning, all the ſeveral propoſitions we want to eſtabliſh.

This diverſity, in the manner of arranging our thoughts, gives riſe to the two-fold diviſion of method eſtabliſhed among logicians, the one called analytic method, or the method of reſolution, inaſmuch as it traces things back to their ſource, and reſolves knowledge into its firſt and original principles. This method ſtands in contradiſtinction to the method of compoſition; or, as it is otherwiſe called, the ſynthetic method: for here we proceed by gathering together the ſeveral ſcattered parts of knowledge, and combining them into one ſyſtem, in ſuch a manner, as that the underſtanding is enabled diſtinctly to follow truth through all the different ſtages of gradations.

Composition, in muſic, the art of diſpoſing muſical ſounds into airs, ſongs, &c. either in one or more parts, to be ſung by a voice, or played on inſtruments. See the articles Music and Song.

Composition, in oratory, the coherence and order of the parts of a diſcourſe.

To compoſition belong both the artful joining of the words, whereof the ſtyle is formed, and whereby it is rendered ſoft and ſmooth, gentle and flowing, full and ſonorous; or the contrary; and the order, which requires things firſt in nature and dignity, to be put before thoſe of inferior conſideration.

Composition, in painting, conſiſts of two parts, invention and diſpoſition; the firſt is the choice of the objects which are to enter into the compoſition of the ſubject the painter intends to execute, and is either ſimply hiſtorical or allegorical.

The other very much contributes to the perfection and value of a piece of painting.

Composition, in pharmacy, the method of mixing and compounding medicines of different qualities, ſo that they may aſſiſt each other's virtues, or ſupply each other's defects.

Composition, in commerce, a contract between an inſolvent debtor and his creditors, whereby the latter accept of a part of the debt in compenſation for the whole, and give a general acquittance accordingly.

Composition, in printing, commonly termed compoſing, the arranging of ſeveral types, or letters, in the compoſing ſtick, in order to form a line; and of ſeveral lines ranged in order in the galley, to make a page; and of ſeveral pages, to make a form.

Composition *of Motion*, or Forces, is an aſſemblage of ſeveral directions of motion reſulting from ſeveral powers acting in different, tho' not oppoſite, directions.

The doctrine of compoſition and reſolution of motion is founded on Sir Iſaac Newton's Second Law of Nature, viz. "The change of motion is always proportionable "to the moving force impreſſed, and is always made "according to the right line in which that force is impreſſed."

Let the body B (plate XLII. *fig.* 13.) be impelled by the body A, in the direction bc, with a force that would, in a given time, cauſe it to move from b to c; at the ſame inſtant, let another body C ſtrike it in the direction bd, with a force that will carry it from b to d in the ſame time: then completing the parallelogram $bced$, and drawing the diagonal be, this laſt will repreſent the direction and diſtance through which the body will move in the ſame time, by both the forces conjointly.

This is evident, if we conſider that the force impreſſed by the body C, does no way diminiſh the velocity of a body approaching to the line ce, at the end of the given time, and therefore it will then be found ſomewhere in the ſaid line ce; for the ſame reaſon it will, at the end of the ſaid time, be carried to a diſtance from bc equal to bd; and therefore it muſt alſo, at the ſame moment, be found ſomewhere in the line de; but it cannot be in the lines ce and de at the ſame time, unleſs in that point e, where they interſect each other, as the propoſition aſſerts.

We may now conceive the body B moving by the ſingle impulſe of ſome power in the direction be, ſuch as will carry it through the ſpace be in a given time; then this may be reſolved into any other two forces acting in the direction be or de, and bd or ce, which lines will alſo repreſent the efficacy of the ſaid forces in the ſame time.

Composition *of Proportion*. See Proportion.

COMPOST, in huſbandry and gardening, ſeveral ſorts of ſoils, or earthy matter, mixed together, in order to make a manure for aſſiſting the natural earth in the work of vegetation, by way of amendment or improvement.

Compoſts are various, and ought to be different, according to the different nature or the quality of the ſoils which they are deſigned to meliorate, and according as the land is either light, ſandy, looſe, heavy, clayey, or cloddy. A light, looſe land requires a compoſt of a heavy nature, as the ſcouring of deep ditches, ponds, &c. ſo, on the other hand, land that is heavy, clayey, or cloddy, requires a compoſt of a more ſprightly and fiery nature, that will inſinuate itſelf into the lumpiſh clods, which, if they are not thus managed, would very much obſtruct the work of vegetation. See Clay, &c.

The great uſe of compoſts is for ſuch plants as are preſerved in pots, or tubs; or ſometimes it is uſed for ſmall beds, or borders of flower-gardens: but it is too expenſive to make compoſts for large gardens, where a great quantity of ſoil is required. In making of compoſts, great care ſhould be had that the ſeveral parts are properly mixed together, and not to have too much of any one ſort thrown together.

COMPOSTO, in muſic, means compounded or doubled, as a fifteenth is an octave doubled, or an octave is compounded of a fifth and a fourth.

COMPOUND, in a general ſenſe, an appellation given to whatever is compoſed or made up of different things: thus we ſay, a compound word, compound ſound, compound taſte, compound force, &c. See the articles Word, Sound, &c.

Compound Flower, one conſiſting of ſeveral diſtinct leſſer flowers, or corollulæ, each furniſhed with a ſtyle, ſtamina, &c. See Flower.

The corollulæ are of two kinds, viz. tubulated and ligulated: the tubulated ones are always furniſhed with a campanulated limb, divided into four or five ſegments; whereas the ligulated corollulæ have only a flat, linear limb, terminated by a ſingle point, or by a broader extremity, divided into three or five ſegments.

The plants with compound flowers are extremely numerous, forming a claſs by themſelves, called by Linnæus, ſyngeneſia. See the article SYNGENESIA.

COMPOUND-INTEREST. See the article INTEREST.

COMPOUND-MOTION, that effected by the concurring action of ſeveral different powers. Thus, if one power act in the direction of, and with a force proportional to, the end of a parallelogram, and another act in the direction of, and with a force proportional to, its ſide, the compound motion will be in the direction of, and proportional to, the diagonal of the ſaid parallelogram. See COMPOSITION *of Motion*.

COMPOUND-NUMBERS, thoſe which may be divided by ſome other number beſides unity, without having any remainder: ſuch are 18, 20, &c. the firſt being meaſured by the numbers 2, 6, or 9; and the ſecond, by the numbers 2, 4, 5, 10.

COMPOUND PENDULUM, QUANTITIES, RATIO, &c. See the articles PENDULUM, QUANTITY, RATIO, &c.

COMPOUNDER, in general, denotes one who compounds ſeveral things together.

COMPREHENSION, in logic, the ſame with apprehenſion. See APPREHENSION.

COMPREHENSION, or SYNECDOCHE, a trope or figure in rhetoric, which puts the name of the whole for a part, or of a part for the whole; a general for a particular of the ſame kind; or a particular for a general. By this trope a round and certain number is often ſet down for an uncertain one.

COMPRESS, in ſurgery, a bolſter of ſoft linen cloth, folded in ſeveral doubles, frequently applied to cover a plaſter, in order not only to preſerve the part from the external air, but alſo the better to retain the dreſſings or medicines.

Compreſſes are frequently applied where no plaſter is made uſe of; and that ſometimes dry, ſometimes wetted with certain liquors, which are ſuppoſed to be ſtrengthening, reſolving, lenient, emollient, or cooling, which are adminiſtered hot or cold, as the circumſtances of the caſe ſhall require.

Compreſſes of all kinds are intended for theſe purpoſes: 1. To preſerve and cheriſh the natural heat of the body. 2. To ſecure the dreſſings that lie under them. 3. To convey liquid remedies to parts wounded, or otherwiſe diſordered, and to prolong the uſe of them. 4. To fill up any cavity or depreſſions of the parts; and, 5. To prevent bandages from bringing on a troubleſome itching, or other pain or uneaſineſs upon the ſkin.

COMPRESSED LEAF, among botaniſts, one with a mark or impreſſion on both ſides. See LEAF.

COMPRESSOR, in anatomy, a muſcle of the face, more uſually known by the name of elevator alæ naſi.

COMPROMISE, a treaty, or contract, whereby two contending parties eſtabliſh one or more arbitrators, to judge of and terminate their difference in an amicable way.

COMPTROLLER, or CONTROLLER. See the article CONTROLLER.

COMPUNCTION, in theology, an inward grief of mind for having offended God.

COMPURGATOR, in law, a perſon that by oath juſtifies or clears another's innocence.

COMPUTATION, in a general ſenſe, the manner of eſtimating time, weights, meaſure, monies, or quantities of any kind.

COMPUTATION, among mathematicians, is uſed in the like ſenſe as calculation. See the article CALCULATION.

COMPUTATION, in law, is uſed in reſpect of the true account or conſtruction of time, ſo underſtood, as that neither party to an agreement, &c. may do wrong to the other; and that the determination of time be not left at large, or taken otherwiſe than according to the judgment and intention of law.

COMPUTO, in law, a writ to compel a bailiff, receiver, or accountant, &c. to deliver up his accounts.

CONARION, or CONOIDES, a name for the pineal gland, a ſmall gland about the bigneſs of a pea, placed in the upper part of that hole in the third ventricle of the brain, called the anus, and tied by ſome fibres to the nates. See BRAIN.

CONATUS, a term frequently uſed in philoſophy and mathematics, defined by ſome to be a quantity of motion, not capable of being expreſſed by any time, or length; as the *conatus recedendi ab axe motus*, is the endeavour which a body, moved circularly, does to recede, or fly off, from the center or axis of its motion

CONCAVE, an appellation uſed in ſpeaking of the inner ſurface of hollow bodies, but more eſpecially of ſpherical ones.

CONCAVE GLASSES, ſuch as are ground hollow, and are uſually of a ſuperficial figure, though they may be of any other, as parabolical, &c. All objects ſeen through concave glaſſes, appear erect and diminiſhed. The confuſed appearance of a point, through any concave glaſs, proceeds from the too great divergency of thoſe rays which fall on the eye: wherefore, ſince the more remote the eye is from the glaſs, the leſs will the rays diverge; then the further the eye is from the concave glaſs, the more diſtinct will be the appearance of any object through it, though the more faint.

The apparent place of objects ſeen through concaves is always brought nearer to the eye, which is the reaſon they help ſhort-ſighted perſons, or ſuch as can ſee diſtinctly only thoſe objects that are very near them. The rule to fit concave glaſſes to the eye of a near-ſighted perſon, is this: let him obſerve nicely the diſtance at which he can read letters, or ſee objects diſtinctly, which ſuppoſe to be at twelve feet; then will a concave glaſs, whoſe virtual focus is a foot diſtant from it, make that perſon ſee diſtant objects diſtinctly. The farther the eye is removed from any concave glaſs, the leſs the object appears, and a leſſer area of it is ſeen; and when the glaſs is exactly in the middle, between the eye and the object, the object will appear the moſt diminiſhed, that the diſtance between the eye and the object will admit of. See the articles FOCUS, LENS, and MIRROR.

CONCENTRATION, in general, ſignifies the bringing things nearer a center. Hence the particles of ſalt, in ſea water, are ſaid to be concentrated; that is, brought nearer each other, by evaporating the watery part: thus, alſo, wine is ſaid to be concentrated, when its watery parts are ſeparated in the form of ice by froſt.

CONCENTRIC, in mathematics, ſomething that has the ſame common center with another: it ſtands in oppoſition to excentric.

CONCEPTACULUM, among botaniſts, a kind of pericarpium, compoſed of ſoft and leſs rigid valves, and containing only one cavity.

CONCEPTION, among phyſicians, &c. denotes the firſt formation of an embryo in the womb of its parent, who from that time becomes pregnant. See the articles GENERATION and PREGNANCY.

Immaculate CONCEPTION, a feſtival in the Romiſh church, obſerved on the 8th of December, in commemoration of the holy virgin's having been conceived and born immaculate, or without original ſin. The immaculate conception of the Virgin, though reckoned a pious opinion, is no article of faith in the Romiſh church, ſeveral of whoſe members have oppoſed it.

CONCEPTION *of our Lady*, a religious order in Portugal, founded in the XVth century. This order has ſince paſſed into Italy, and got footing in Rome and Milan. The religious, beſides the grand office of the Franciſcans, recited on Sundays and holydays, have a leſſer office, called the office of the conception of the Holy Virgin.

CONCEPTION, in logic, the ſame with apprehenſion. See APPREHENSION.

CONCERT, or CONCERTO, in muſic, a number or company of muſicians, playing or ſinging the ſame piece of muſic or ſong at the ſame time.

A concerto for any inſtrument, as organ, harpſichord, violin, &c. is a piece of muſic, wherein either of thoſe inſtruments has the greateſt part; or in which the performance is partly alone, and partly accompanied by the other parts.

CONCERTANTE, thoſe parts of a piece of muſic that ſing or play throughout the whole piece, either alone, or accompanied, to diſtinguiſh thoſe parts that play now and then in particular places.

CONCERTATO intimates the piece of muſic to be compoſed in ſuch a manner, as that all the parts may have their recitatives, be it for two, three, four, or more voices or inſtruments.

CONCERTO GROSSI, the grand chorus of a concert, or thoſe places where all the ſeveral parts perform or play together.

CONCESSI, in law, a term frequently uſed in conveyances. Its effect is to create a covenant, as *dedi* does a warranty.

CONCESSION, in rhetoric, a figure, whereby ſomething is freely allowed, that yet might bear diſpute, to obtain ſomething that one would have granted to him, and which he thinks cannot fairly be denied, as in the following conceſſion of Dido, in Virgil:

> " The nuptials he diſclaims, I urge no more;
> " Let him purſue the promiſed Latian ſhore.
> " A ſhort delay is all I aſk him now;
> " A pauſe of grief, an interval from woe."

CONCHA, a genus of bivalve ſhells, the animal inhabiting which is called tethys. See the article TETHYS.

CONCHA, in anatomy, the larger cavity of the external ear, ſituated before the meatus auditorius, or paſſage into the internal ear.

CONCHOID, or CONCHILIS, in geometry, a curve line, which always approaches nearer a ſtraight line to which it is inclined, but never meets it.

It is deſcribed thus: draw a right line B D (plate XLII. *fig.* 14.) and another A C, perpendicular to it in E; draw any number of right lines, as C M, C M, cutting B D in Q; make Q M = QN = A E = E F; the curve wherein the points M, M, are found, is the *conchilis*, or *conchois prima*; ſo called by its inventor Nicomedes. The others, wherein the points N, N, are found, is the *conchois ſecunda*; the right line B D the rule, the point C the pole. The inventor alſo contrived an inſtrument, whereby the firſt conchois may be deſcribed mechanically: thus, in the rule A D (*fig.* 15.) is a channel or groove cut, ſo as a ſmooth nail, firmly fixed in the moveable rule C B, in the point F, may ſlide freely within it: into the rule E G is fixed another nail in K, for the moveable rule C B to ſlide upon.

If then the rule B C ſo moved, as that the nail F paſſes along the canal A D, the ſtyle or point in C will deſcribe the firſt conchoid.

Now let $AP = x$, $AE = a$, $PE = MR = a - x$; wherefore as x increaſes, $a - x$ or M R will decreaſe, and therefore the curve continually approaches nearer to the rule B D.

In the ſame manner it appears that the right line N O muſt continually decreaſe, and therefore that the ſecond conchoid alſo muſt continually approach nearer the rule.

Now as between each conchoid and the right line B D, there will ſtill be the right line Q M or Q N, equal to A E; neither of the conchoids can concur with the right line B D, conſequently D is an aſymptote of each conchoid.

Put $b = CE$, $a = EA = MQ$, $CQ = x$, $MR = y$; then by the ſimilar triangles C E Q, Q R M, we have $CE : CQ :: MR : MQ$, that is $b : x :: y : a$, whence $ba = xy$.

Sir Iſaac Newton, in the latter part of his Univerſal Arithmetic, tells us, that the conchoid was uſed by Archimedes, and other ancients, in the conſtruction of ſolid problems; and he himſelf prefers it before other curves, or even the conic ſections, in the conſtruction of cubic and biquadratic equations, on account of its ſimplicity and eaſy deſcription, ſhewing therein the manner of their conſtruction by help of it.

CONCHYLIA, a general name for all kinds of petrified ſhells, as limpets, cochlea, nautili, conchæ, lepades, &c.

CONCINNOUS INTERVALS, in muſic, are ſuch as are fit for muſic, next to, and in combination with, concords; being neither very agreeable nor diſagreeable in themſelves, but having a good effect, as by their oppoſition they heighten the more eſſential principles of pleaſure; or as by their mixture and combination with them, they produce a variety neceſſary to our being better pleaſed.

CONCINNOUS SYSTEM, in muſic. A ſyſtem is ſaid to be concinnous, when its parts, conſidered as ſimple intervals, are concinnous; and are beſides placed in ſuch an order between the extremities, as that the ſucceſſion of ſounds, from one extreme to the other, may have an agreeable effect.

CONCLAVE, the place in which the cardinals of the Romiſh church meet, and are ſhut up, in order to the election of a pope.

The conclave is a range of ſmall cells, ten feet ſquare, made of wainſcot: theſe are numbered, and drawn for by lot. They ſtand in a line along the galleries and hall of the Vatican, with a ſmall ſpace between each. Every cell has the arms of the cardinal over it. The conclave is not fixed to any one determinate place, for the conſtitutions of the church allow the cardinals to make choice of ſuch a place for the conclave as they think moſt convenient; yet it is generally held in the Vatican.

The conclave is very ſtrictly guarded by troops: neither the cardinals, nor any perſon ſhut up in the conclave, are ſpoke to, but at the hours allowed of, and then in Italian or Latin; even the proviſions for the conclave are examined, that no letters be conveyed by that means from the miniſters of foreign powers, or other perſons who may have an intereſt in the election of the pontiff.

CONCLAVE is alſo uſed for the aſſembly or meeting of the cardinals ſhut up, for the election of a pope.

CONCLUSION, in logic, the conſequence or judgment drawn from what was aſſerted in the premiſes; or the previous judgments in reaſoning, gained from combining the extreme ideas between themſelves. See the article SYLLOGISM.

CONCOCTION, in medicine, the change which the food undergoes in the ſtomach, &c. to become chyle. See CHYLE, CHYLIFICATION, and DIGESTION.

CONCOMITANT, in theology, ſomething that accompanies or goes along with another; as concomitant grace is that which God affords us, during the courſe of our actions, to enable us to perform them; and according to the Romiſh divines, to render them meritorious.

CONCORD, in grammar, that part of conſtruction called ſyntax, in which the words of a ſentence agree; that is, in which nouns are put in the ſame gender, number, and caſe; and verbs in the ſame number and perſon with nouns and pronouns.

CONCORD, in muſic, the relation of two ſounds that are always pleaſing to the ear, whether applied in conſonance or in ſucceſſion.

If two ſimple ſounds have ſuch a relation, or difference of tune, as that, when mixed together, they form a compound ſound, which agreeably affects the ear, that relation is denominated concord: and whatever two ſounds agree in conſonance, the ſame will follow each other agreeably, or be pleaſing in ſucceſſion. The reverſe of a concord is a diſcord, being all the relations or differences of tune that are grating to the ear.

Concord and harmony are, in fact, the ſame thing, though by cuſtom they are applied differently, harmony expreſſing the agreement of a greater number of ſounds than two in conſonance; beſides, harmony always implies conſonance; but concord is ſometimes applied to ſucceſſion, though never but when it will make a pleaſing conſonance: whence it is, that Dr. Holder, and ſome others, uſe the word conſonance for what is called concord.

Uniſonance being the relation of equality between the tune of two ſounds, all uniſons are concords, in the firſt degree: but an interval, being a relation of inequality between two ſounds, becomes a concord or diſcord, according to the variety of that particular relation: Mr. Malcolm thinks, that as the word implies agreement, it is applicable to uniſon in the firſt degree.

The differences of tune take their riſe from the different proportions of the vibrations of a ſonorous body, that is, of the velocity of thoſe vibrations in their recourſes; the more frequent thoſe recourſes are, the more acute is the tune, *& vice verſa.* But the eſſential difference between concord and diſcord lies more remote: there does not appear any natural aptitude in two ſounds of a concord to give a pleaſing ſenſation, more than in two of a diſcord; theſe different effects muſt be reſolved into the divine will.

We know from experience what proportions of tune are pleaſing, and what not; and we know likewiſe how to expreſs the difference of tune by the proportion of numbers; we know what is pleaſing, though we do not know why: for inſtance, we know that the ratio of 1 : 2 conſtitutes concord, and 6 : 7 diſcord; but on what original ſyſtem pleaſing or diſpleaſing ideas are connected with thoſe relations, and their proper influence upon one another, is entirely above our reach.

We know that the following ratio's of the lengths of chords are concord 2 : 1, 3 : 2, 4 : 3, 5 : 4, 6 : 5, 5 : 3, 8 : 5; that is, by taking any chord for a fundamental, repreſented by one, the following diviſions thereof will be all concords with the whole, as $\frac{1\ 2\ 3\ 4\ 5\ 3\ 5}{2.3.4.5.6.5.8.}$ So that the characteriſtic of concords and diſcords muſt be looked for in theſe numbers, expreſſing the intervals of ſound; not abſtractly, but as exhibiting the number of vibrations.

Now uniſons are in the firſt degree of concord, or have the moſt perfect agreement in tune; and therefore have ſomething acceſſory to that agreement which is more or leſs to be found in every concord: but it is not true, that the nearer two ſounds approach to an equality of tune, the more agreement they have; therefore it is not in the equality or inequality of the numbers that this agreement conſiſts.

Farther, if we conſider the number of vibrations made in any given time by two chords of equal time, they are, on the principle already laid down, equal; and therefore the vibrations of the two chords commence together as frequently as poſſible; that is, they coincide at every vibration, in the frequency of which coincidence, and of the undulations of the air occaſioned thereby, it is that the difference of concord and diſcord muſt be ſought.

Now, the nearer the vibrations of two ſtrings approach to a coincidence as frequent as poſſible, the nearer they ſhould approach that condition, and conſequently the agreement of uniſons, as is confirmed from experience.

If we take the natural ſeries, 1, 2, 3, 4, 5, 6, and compare each number to the next, as expreſſing the number of vibrations of two chords in the ſame time, whoſe lengths are reciprocally as thoſe numbers; the rule will be found exact; for 1 : 2 is beſt, then 2 : 3; after 6 the conſonance is inſufferable, as the coincidences are too rare; though there are other ratio's that are agreeable, beſides thoſe found in that continued order, namely, 3 : 5 and 5 : 8, which, with the preceding five, are all the concording intervals within, or leſs than an octave, or 1 : 2; that is, whoſe acuteſt term is greater than half the fundamental.

On this principle 3 : 5 will be preferable to 4 : 5, becauſe, being equal in the number of vibrations of the acuter term, there is an advantage on the ſide of the fundamental in the ratio 3 : 5, where the coincidence is made at every third vibration of the fundamental, and every fifth of the acute term: in like manner the ratios 5 : 8 is leſs perfect than 5 : 6; becauſe though the vibrations of each fundamental, that go to one coincidence, are equal, yet, in the ratio 5 : 6, the coincidence is at every ſixth of the acute term, and only at every eighth in the other.

Thus there is a rule for judging of the preference of concords from the coincidence of their vibrations, as in the following table.

Ratio's or Vibrations.				*Coincid.*
	Grave Term.		Acute Term.	
Uniſon,	1	:	1	
Octave, 8ve,	2	:	1	60
Fifth, 5th.	3	:	2	30
Fourth, 4th.	4	:	3	20
Sixth, gr.	5	:	3	20
Third, gr.	5	:	4	15
Third, leſſer.	6	:	5	12
Sixth, leſſer.	8	:	5	12
	Grave	Lengths.	Acute	

Though this order be ſettled by reaſon, it is confirmed by the ear; ſo that, upon this foot, concords muſt be the more perfect, as they have the greater number of coincidences, with regard to the number of vibrations in both chords; and where the coincidences are equal, the preference will fall on that interval, whoſe acuteſt term has feweſt vibrations to each coincidence: which rule is, however, in ſome caſes contrary to experience; and yet is the only rule hitherto diſcovered.

F. Merſenne, it is true, after Kircher, gives another ſtandard for ſettling the comparative perfection of intervals, with regard to the agreement of their extremes in tune.

The perception of concordance, ſay they, is nothing but the comparing of two or more different motions which in the ſame time affect the auditory nerve: now we cannot certainly judge of any conſonance till the air be as often ſtruck in the ſame time by two chords, as there are units in each member expreſſing the ratio of that concord; as for inſtance, we cannot perceive a fifth, till two vibrations of the one chord, and three of the other are performed together, which chords are in length as 3 to 2: ſo that thoſe concords are the moſt ſimple and agreeable, which are generated in the leaſt time; and thoſe, on the contrary, the moſt compound and grating, which are produced in the longeſt time.

For example, let 1, 2, 3, be the lengths of three chords; 1 : 2 is an octave; 2 : 3 a fifth; and 1 : 3 an octave and fifth compounded, or a twelfth. The vibrations of chords being reciprocally as their lengths, the chord 2 will vibrate once, while the chord 1 vibrates twice, and then exiſts an octave; but the twelfth does not yet exiſt, becauſe the chord 3 has not vibrated once, nor the chord 1 thrice, which is neceſſary to form a twelfth.

Again, to generate a fifth, the chord 2 muſt vibrate thrice, and the chord 3 twice; in which time the chord 1 will have vibrated 6 times; and thus the octave will be thrice produced, while the twelfth is only produced twice; the chord 2 uniting its vibrations ſooner with the chord 1, than with the chord 3; and they being ſooner conſonant than the chord 1 or 2 with that of 3.

But this rule, upon examining it by other inſtances, Mr. Malcolm has ſhewn to be defective, as it does not anſwer in all poſitions of the intervals with reſpect to each other; but in a certain order required: and there being no rule, as to the order, to make this ſtandard tally with experience in every caſe; we are at laſt left to determine the degrees of concord by experience and the ear.

So that the whole may be ſummed up in this definition: concord is the reſult of a frequent union, or coincidence of the vibrations of two ſonorous bodies, and conſequently of the undulating motions of the air, which, ariſing from theſe vibrations, are ſimilar and proportionable to them; which coincidence, the more frequent it is, with regard to the number of vibrations of both bodies, performed in the ſame time, cæteris paribus, the more perfect is that concord: till the unfrequency of the coincidence, in reſpect of one or both the motions, commence diſcord.

Mr. Carre, in the Memoirs of the Royal Academy, lays down a general propoſition to determine the proportion of cylinders that are to form the concords of muſic; namely, that the ſolid cylinders, whoſe ſounds produce thoſe concords, are in a triplicate and inverſe ratio of that of the numbers which denote the ſame concords.

For inſtance, ſuppoſe two cylinders, the diameters of whoſe baſes and lengths are as 3 to 2, their ſolidities will be in the ratio of 27 to 8, which is the triplicate ratio, or as the cube of 3 to that of 2; conſequently the ſounds of thoſe two cylinders will produce a fifth, as expreſſed by thoſe numbers; and that the biggeſt and longeſt will give the grave ſound, and the ſmalleſt the acute: and ſo of all the reſt.

Concords are divided into original, or ſimple and compound. A ſimple concord is that whoſe extremes are leſs remote than the ſum of any other two concords. A compound concord is equal to two or more concords.

Other muſical writers ſtate the diviſion in this manner; an octave is 1 : 2 and all the inferior concords abovementioned are ſimple ones: and all greater than an octave are compound concords; as conſiſting of, and being equal to, the ſum of one or more octaves, and ſome ſingle concord leſs than an octave, and are uſually, in practice, called ſimple concords.

As to the compoſition and relations of original concords, by applying to them the rules of the addition and ſubtraction of intervals, they will be divided into ſimple and compound, according to the more general notion; as,

5 : 6 a 3d leſs	5th	3d g. and 3d l.	of	5th 4th or 6th
4 : 5 a 3d gr.	6th leſs	4th and 3d l.		gr. 3d leſs or
3 : 4 a 4th	6th gr.	4th and 3d g.		3d gr. 3d l.
				4th

The octave is not only the firſt concord in point of perfection, the agreement of whoſe extremes is greateſt, and the neareſt to uniſon; ſo that, when ſounded together, it is impoſſible to perceive two different ſounds; but it is likewiſe the greateſt interval of the ſeven original concords; and, as ſuch, contains all the leſſer, which derive their ſweetneſs from it, as they more or leſs directly riſe out of it, and which gradually decreaſe from the octave to the leſſer ſixth, having but a ſmall degree of concord.

The manner in which thoſe leſſer concords are found in the octave ſhews their mutual dependences. For, taking an harmonical and arithmetical mean betwixt each extreme, and the moſt diſtant of the two means laſt found, to wit, betwixt the leſſer extreme and the firſt arithmetical mean, and betwixt the greater extreme and the firſt harmonical mean, we have all the leſſer concords. Thus if, betwixt 360 and 180 the extremes of the octave, you take an arithmetical mean, it is 270, and an harmonical one is 240. Then betwixt 360 the greateſt extreme, and 240 the harmonical mean, take an arithmetical mean, it is 300; and an harmonical mean is 288. Again, betwixt 180 the leſſer extreme of the octave, and 270 the firſt arithmetical mean, it is 225, and an harmonical one 216.

Thus you have a ſeries of all the concords, both aſcending towards acuteneſs from a common fundamental term 360, and deſcending towards gravity from a common acute term 180: which ſeries has this property, that taking the two extremes, and any other two at equal diſtances, theſe four will be geometrically proportional.

The octave, by immediate diviſion, becomes a fourth and fifth; the fifth again, by immediate diviſion, produces the two thirds; the two thirds are therefore found by diviſion, though not immediately. And the ſame is true of the two ſixths. Thus all the original concords ariſe from the diviſion of the octave; the fifths and fourths immediately, the thirds and ſixths mediately.

From the perfection of the octave, it may be doubled, tripled, &c. and yet preſerve a concord; that is, the ſum of two or more octaves is concord; though the more compound will be gradually leſs agreeable; but it is not ſo with any other concord leſs than octave, the doubles, &c. whereof are all diſcords.

Again, whatever ſound is concord to one extreme of the octave, is concord to the other alſo; and, if you add any other ſimple concord to an octave, it agrees to both its extremes, to the neareſt being a ſimple concord, and to the fartheſt a compound one.

The greateſt number of vibrations of the fundamental, it is to be farther obſerved, cannot exceed five, or there is no concord where the fundamental makes more than five vibrations to one coincidence with the acute term. This progreſs of the concords may be carried on *in infinitum*, but the more compound, the leſs agreeable. A ſingle octave is better than a double one, and that than a triple one; and ſo of fifths and other concords. Three or four octaves is the greateſt length in common practice: the old ſcales went but to two; no voice or inſtrument can well reach above four.

CONCORDANCE, a ſort of dictionary of the Bible, explaining the words thereof in alphabetical order, with the ſeveral books, chapters, and verſes quoted, in which they are contained.

CONCORDANT VERSES, are ſuch as have ſeveral words in common, but which, by the addition of other words, convey an oppoſite or at leaſt a very different meaning.

CONCRETE, in the ſchool-philoſophy, an aſſemblage or compound. See the article COMPOUND.

CONCRETE, in natural philoſophy and chemiſtry, ſignifies a body made up of different principles, or any mixed body: thus a ſope is a factitious concrete, or a body mixed together by art; and antimony is a natural concrete, or a mixed body, compounded in the bowels of the earth.

CONCRETE, in logic, is uſed in contradiſtinction to abſtract; for example, when we conſider any quality, as whiteneſs, inherent in any ſubject, as, ſuppoſe, in ſnow; if we may ſay the ſnow is white, then we ſpeak of whiteneſs in the concrete: but if we conſider whiteneſs by itſelf, as a quality that may be in paper, in ivory, and in other things, as well as in ſnow, we are then ſaid to conſider, or to take it in the abſtract. See the article ABSTRACT.

CONCRETE NUMBERS, are thoſe which are applied to expreſs or denote any particular ſubject, as two men, three pounds, two thirds of a ſhilling, &c. whereas if nothing be concreted with the number, it is taken abſtractly, or univerſally. Thus three ſignifies an aggregate of three unites; let theſe unites be men, pounds, or whatever elſe you pleaſe.

CONCRETION, the uniting together ſeveral ſmall particles of a natural body into ſenſible maſſes, or concretes, whereby it becomes ſo and ſo figured and determined, and is indued with ſuch and ſuch properties. See CONCRETE.

CONCUPISCENCE, according to divines, an irregular appetite, or luſt after carnal things, inherent in the nature of man ever ſince the fall.

CONCURRING, or CONGRUENT FIGURES, in geometry, thoſe which being laid upon one another, exactly correſpond and cover each other, and therefore are equal.

CONDEMNATION, the act of giving judgment, paſſing or pronouncing ſentence againſt a perſon intereſted thereby to ſome penalty or puniſhment, either in reſpect of life, reputation, or fortune. See SENTENCE and PUNISHMENT.

CONDENSATION, the act whereby a body is rendered more denſe, compact, and heavy.

Hence condenſation ſtands oppoſed to dilatation, or rarefaction; which latter renders the body lighter and looſer, by ſetting the parts further aſunder; whereas the former brings them cloſer to each other, and increaſes their contact.

Condenſation is, by moſt writers, diſtinguiſhed from compreſſion, in regard the latter is performed by ſome external violence; whereas the former is the action of cold.

CONDENSER, a pneumatic engine, or ſyringe, whereby an uncommon quantity of air may be crowded into a given ſpace; ſo that ſometimes ten atmoſpheres, or ten times as much air as there is at the ſame time, in the ſame ſpace, without the engine, may be thrown in by means of it, and its egreſs prevented by valves properly diſpoſed. See plate XLIV. *fig.* 1.)

It conſiſts of a braſs cylinder, wherein is a moveable piſton; which being drawn out, the air ruſhes into the cylinder through a hole provided on purpoſe; and when the piſton is again forced into the cylinder, the air is driven into the receiver through an orifice, furniſhed with a valve to hinder its getting out.

The receiver or veſſel containing the condenſed air, ſhould be made very ſtrong, to bear the force of the air's ſpring thus increaſed; for which reaſon they are generally made of braſs: its orifice is fitted with a female ſcrew to receive the male ſcrew at the end of the condenſer.

If glaſs be uſed for a condenſer, it will not ſuffer ſo great a degree of condenſation; but the experiment will be more entertaining, ſince the ſubject may be viewed in the condenſed air.

CONDERS, a term uſed in the herring fiſhery, for people who ſtand on cliffs or eminences near the ſea-coaſt, to direct the fiſhermen which way the ſhoal of herrings paſſes; their courſe being more conſpicuous to thoſe who ſtand on high cliffs aſhore, than to thoſe on board the veſſels.

Fig 1. Coulouver

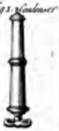


Fig. 2. Cone

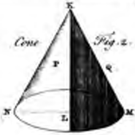


Fig. 3 Cone

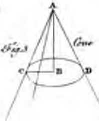


Fig. 4. Cone

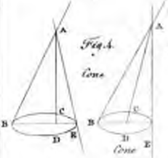


Fig. 5. Cone

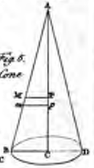
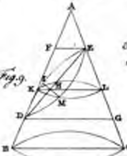


Fig. 9.


A
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Conic Sections

Fig. 13. Course

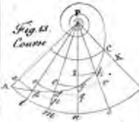
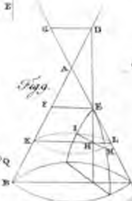


Fig. 9.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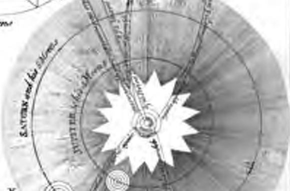
Conic Sections

Fig. 11. COPERNICAN SYSTEM


SATURN and his 5 Moons
JUPITER & his Moons

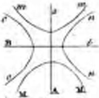

m
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Fig. 10. Conjugate

Fig. 8. Conic Sections

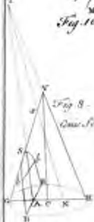


Fig. 7. Conic Sections

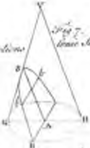


Fig. 6.

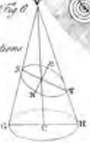
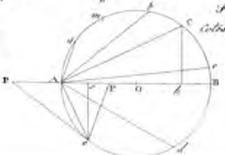


Fig. 12. Cotesian Theorem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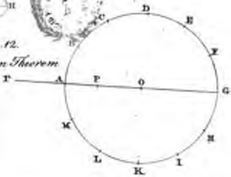
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CONDITION, in the civil law, a clauſe of obligation ſtipulated as an article of a treaty or contract; or in a donation of teſtament, legacy, &c. in which laſt caſe a donee does not loſe his donative, if it be charged with any diſhoneſt or impoſſible conditions.

The conditions under which a donation can be made, are diſtinguiſhed into three kinds, 1. The caſual, which depends merely on chance. 2. The poteſtative, which is abſolutely in our power; and, 3. The mixed condition, which is compounded of the other two.

Condition, in common law, a reſtriction annexed to an act, qualifying or ſuſpending the ſame, in rendering its effect precarious and uncertain.

CONDITIONAL, ſomething not abſolute but ſubject to conditions.

Conditional legacies are not due till the conditions are accompliſhed.

Conditional Conjunctions, in grammar, are thoſe which ſerve to make propoſitions conditional. As, *if*, *unleſs*, *provided*, &c.

Conditional Propositions, in logic, ſuch as conſiſt of two parts connected together by a conditional particle.

Conditional Syllogism, a ſyllogiſm where the major is a conditional propoſition. Thus,

If there is a God, he ought to be worſhipped.
But there is a God; .
Therefore he ought to be worſhipped.

The Arminian divines maintain, that all the decrees of God relating to the ſalvation and damnation of man, are truely conditional; and the Calviniſts, that they are abſolute.

Science of conditionals, that is, of conditional truths, is the knowledge which God has of things conſidered not according to their eſſence, their nature, or their real exiſtence, but under a certain ſuppoſition which imports a condition never to be accompliſhed.

CONDORMIENTES, in church hiſtory, religious ſectuaries, who hold their name from lying all together, men and women, young and old. They aroſe in the thirteenth century near Cologne, where they are ſaid to have worſhipped an image of Lucifer, and to have received anſwers and oracles from him.

Another ſpecies of condormientes, were a branch of anabaptiſts in the ſixteenth century; ſo called, becauſe they lay ſeveral of both ſexes in the ſame chamber, on pretence of evangelical charity.

CONDUCT, or *Safe* **Conduct**, a deed or ſecurity granted to an enemy, under the great ſeal of a prince, that he may paſs and repaſs without being moleſted.

CONDUCTOR, in ſurgery, an inſtrument which ſerves to conduct the knife in the operation of cutting for the ſtone, and in laying up ſinuſes and fiſtulas. It is alſo called a gorget. See the article Stone.

Conductors, in military affairs, are aſſiſtants given to the commiſſary of the ſtores to receive or deliver out ſtores to the army, to attend at the magazines by turns when in garriſon, and to look after the ammunition-waggons in the field. They bring their accounts every night to the commiſſary, and are immediately under his command.

CONDUIT, a canal or pipe for the conveyance of water, or other fluid.

CONDYLOMA, or Condylus, in anatomy. See the article Condylus.

Condyloma, in medicine, a tubercle or callous eminence which ariſes in the folds of the anus, or rather a ſwelling or hardening of the wrinkles of that part.

Condylomata proceed from a redundant and vitiated blood ſtagnating in the hæmorrhoidal veſſels, and are often the effect of venereal ailments. Their cure depends on mercurial unctions and proper eſcharotics to conſume them; though extirpation either by ligature or inciſion, if the nature of the part will admit, is the moſt expeditious. It very often happens that a ſalivation is neceſſary, in order to facilitate and complete the cure.

CONDYLUS, a name given by anatomiſts to a knot in any of the joints formed by the epiphyſis of a bone. In the fingers it is called a knuckle.

Condylus, in botany, ſignifies the joints of plants.

CONE, in geometry, a ſolid body, having a circle for its baſe, and terminated in a point or vertex. The cone may be conceived as generated by the motion of a right line KL (plate XLIV. *fig.* 2.) round an immoveable point K, called its vertex, along the circumference of a plane, called its baſe, MN; or it may formed by the revolution of the triangle KLM, about the right line KL, which is called the axis of the cone, and KM its ſide.

If the axis be perpendicular to the baſe, it is ſaid to be a right cone: and if inclined, or oblique, a ſcalenous cone. Scalenous cones are again divided into obtuſe-angled, and acute-angled.

Euclid defines a cone a ſolid figure, whoſe baſe is a circle, as CD (*fig.* 3.) and is produced by the intire revolution of the plane of a right-angled triangle CAB, about the perpendicular leg AB.

If this leg or axis be greater than CB, half the baſe, the ſolid produced is an acute angled cone; if leſs, it is an obtuſe-angled cone; and, if equal, a right-angled cone.

For a more general and comprehenſive deſcription of a cone, which may take in both right and oblique ones, ſuppoſe an immoveable point A (*fig.* 4.) without the plane of the circle BDEC, and ſuppoſe a right line AE, drawn through that point, and produced indefinitely both ways, to be moved quite round the circumference of the circle; the two ſuperficies that will ariſe from this motion, are each called conic ſuperficies; but taken conjunctly, they are called ſuperficies vertically oppoſite, or only oppoſite ſuperficies. The immoveable point A, common to both the ſuperficies, is called the vertex; the circle BDEC the baſe, the right line AC, drawn through the vertex A, and C the center of the baſe, the axis; and the ſolid comprehended under the conical ſuperficies and the baſe, is a cone.

Let ABDC (*fig.* 5.) be a cone, formed by the revolution of the triangle ABC about the ſide AC, remaining fixed as an axis, it is manifeſt that every line as MP, drawn parallel to BC, will deſcribe a circle, of which that formed by BC will be the greateſt; and that the ſum of all theſe circles will be the whole cone. Put CB $=r$, AC$=a$, and the circumference formed by the point B$=c$, AP$=x$, and MP$=y$; then, as $r:c::y:\frac{cy}{r}$ the circumference of the circle formed by the point M, this multiplied by $\frac{y}{2}$ gives $\frac{cyy}{2r}$ the area of the circle itſelf, this multiplied by $\dot{x}=$Pp will give $\frac{cyy\dot{x}}{2r}$ the conical increment. Again, becauſe of the ſimilar triangles APM, ACB, it will be $x:y::a:r$; wherefore $x=\frac{ay}{r}$ and $\dot{x}=\frac{a\dot{y}}{r}$: putting this therefore in the room of $\dot{x}$ in the former equation, we ſhall have $\frac{cyy\dot{x}}{2r}=\frac{acy\dot{y}y}{2rr}$ for the conical increment; and conſequently $\frac{acy^3}{6r^2}$ for the value of the cone deſcribed by APM; and conſequently $\frac{acr^3}{6r^2}=\frac{acr}{6}$ for the whole cone: for when x becomes equal to a, y becomes equal to r: but when the height of the cone is equal to the diameter of the baſe, then the ſolidity will be $\frac{cr}{6}\times 2r=\frac{crr}{3}$.

We have ſhewn under Cylinder, that the ſolidity of that figure is $\frac{acr}{2}$; this multiplied by $\frac{1}{3}$ gives $\frac{acr}{6}$ for the ſolidity of the inſcribed cone; whence it follows that every cone is $\frac{1}{3}$ of the circumſcribing cylinder, having the ſame baſe and altitude.

Cone and **Key**, among the ancient Saxons, was when a woman at the age of fourteen or fifteen, took upon her the charge of her houſe, and received cone and key; ſhe being then held of competent years to keep the accounts and keys of the houſe.

CONESSI, a ſort of bark of a tree which grows on the Coromandel-coaſt in the Eaſt-Indies. It is recommended in a letter to Mr. Monro, in the Medical Eſſays, as a ſpecific in diarrhœas. It is to be pounded into a fine powder, and made into an electuary with ſyrup of oranges; and the bark ſhould be freſh, and the electuary new made every day, or ſecond day, otherwiſe it loſes its auſtere but grateful bitterneſs on the palate, and its proper effects on the inteſtines.

CONFECTION, in pharmacy, ſignifies in general any thing prepared with ſugar: in particular it imports ſomething preſerved, eſpecially dry ſubſtances.

CONFECTS, a denomination given to fruits, flowers, herbs, roots, &c. when boiled and prepared with ſugar or honey, to diſpoſe them to keep, and render them more agreeable to the taſte.

CONFEDERACY, in a general ſenſe, a league or alliance between ſeveral princes and ſtates, to carry on a common cauſe.

Confederacy, in law, is when two or more combine together to do ſome damage or injury to another, or to commit ſome unlawful action.

CONFERVA, in botany, a genus of water plants, of the cryptogamia claſs, and order of moſſes; conſiſting of oblong, capillary filaments, divided into joints of a globular figure.

CONFESSION, in a legal ſenſe, an acknowledgement of ſome truth, though in prejudice of the perſon that makes the declaration.

Confession, among divines, the verbal acknowledgement which a Chriſtian makes of his ſins.

CONFESSIONAL, or Confessionary, a place in churches under the great altar, where the bodies of deceaſed ſaints, martyrs and confeſſors, were depoſited.

This word is alſo uſed by the Romaniſts for a deſk in the church where the confeſſor takes the confeſſions of the penitents.

CONFESSOR, in the Romiſh church, a prieſt who is impowered to receive the confeſſion of penitents, and to give them abſolution.

CONFIGURATION, the outward figure which bounds bodies, and gives them their external appearance; being that which, in great meaſure, conſtitutes the ſpecific difference between bodies.

Configuration *of the Planets*, in aſtrology, a certain ſituation of the planets in the zodiac, whereby they are ſuppoſed to aid or oppoſe each other.

CONFIRMATION, in a general ſenſe, the act of ratifying or rendering a title, claim, report, or the like, more ſure and indiſputable.

Confirmation, in law, a conveyance of an eſtate, or right in *eſſe*, from one man to another, whereby a voidable eſtate is made ſure and unavoidable, or a particular eſtate is increaſed, or a poſſeſſion made perfect.

It is alſo the ſtrengthening of an eſtate formerly made, which is avoidable, though not preſently void: as if a biſhop was to grant his chancellorſhip by patent, for term of the patentee's life; this is no void grant, but voidable by the biſhop's death, except it be ſtrengthened by the confirmation of the dean and chapter.

Confirmation, in rhetoric, the third part of an oration, wherein the orator undertakes to prove the truth of the propoſition advanced in his narration; and is either direct or indirect.

Direct, confirms what he has to urge for ſtrengthening his own cauſe. Indirect, properly called contutation, tends to refute the arguments of his adverſaries.

Confirmation, in theology, the ceremony of laying on of hands, for the conveyance of the Holy Ghoſt.

CONFISCATION, in law, the adjudication of goods or effects to the public treaſury, as the bodies and effects of criminals, traitors, &c. Merchandiſes that are prohibited, or brought aboard, or aſhore, without paying the duties when ſeized, are confiſcated.

CONFLAGRATION, the general burning of a city or other conſiderable place.

This word is commonly applied to that grand period or cataſtrophe of our world, when the face of nature is to be changed by a deluge of fire, as formerly it was by that of water.

CONFLUENCE, or Conflux, among geographers, the place where two rivers unite their ſtreams.

CONFLUENT, among phyſicians, &c. an appellation given to that kind of ſmall-pox wherein the puſtules run into each other.

CONFORMATION, the particular conſiſtence and texture of the parts of any body, and their diſpoſition to compoſe a whole.

CONFUSED, in general, is an appellation given to things void of order and method, or which lie jumbled together in one heap: thus we ſay, a confuſed orator, confuſed viſion, ideas, &c.

CONFUSION, in a general ſenſe, is when things prior in nature do not precede, or poſterior do not follow: or a perturbation of order.

Confusion, in phyſic, a diſorder of the eyes, that happens when, upon a rupture of the internal membranes which include the humours, they are all confounded together.

CONFUTATION, in rhetoric, making a branch of confirmation, is that part of an oration wherein the orator ſeconds his own arguments, and deſtroys thoſe produced by his antagoniſt.

CONGE *d'elire*, in eccleſiaſtical polity, the king's permiſſion royal to a dean and chapter in the time of a vacancy, to chooſe a biſhop; or to an abbey, or priory, of his own foundation, to chooſe their abbot or prior.

Conge, in architecture, a mould in form of a quarter round, or a cavetto, which ſerves to ſeparate two members from one another, ſuch as that which joins the ſhaft of the column to the cincture, called alſo apophyge.

Conges are alſo rings or ferrels formerly uſed in the extremities of wooden pillars, to keep them from ſplitting, afterwards imitated in ſtone-work.

CONGELATION, freezing, or ſuch a change produced by cold in a fluid body, that it quits its former ſtate, and becomes congealed.

CONGER, in zoology, the name of a ſpecies of muræna, with the upper edge of the back-fin black; called in Engliſh the ſea-eel.

CONGERIES, a collection or aggregate of ſeveral particles, or bodies united into one maſs.

CONGESTION, in medicine, a collection of humours, formed gradually; whereby it differs from defluxion, which is made on a ſudden.

CONGIUS, a liquid meaſure of the ancient Romans, containing the eighth part of the amphora, or the fourth of the urna, or ſix ſextarii. The congius in Engliſh meaſure contains 2,070,676 ſolid inches; that is, ſeven pints, 4,942 ſolid inches.

CONGLOBATE Gland, in anatomy, a little ſmooth body, wrapt up in a fine ſkin, by which it is ſeparated from all other parts, only admitting an artery and a nerve to paſs in, and giving way to a vein and excretory canal to come out, of which ſort are the glands of the brain and teſtes.

Winſlow includes under the name of conglobate glands, the lymphatic glands alone, and calls all the other glands of the body by the name conglomerate. *See* the next article.

CONGLOMERATE Gland, that which is compoſed of ſeveral little conglobate glands, all tied up together in one common tunicle or membrane. Sometimes all their excretory ducts unite, and make one common pipe, through which the liquor of them all runs, as the pancreas and parotides do. Sometimes the ducts uniting, form ſeveral pipes, which only communicate with one another by croſs canals; and ſuch are the mammæ: others again have ſeveral pipes without any communication with one another; of which ſort are the glandulæ lachrymales, and proſtatæ: and a fourth ſort, is when each little gland has its own excretory duct, thro' which it tranſmits its liquor to a common baſon, as the kidneys.

CONGLUTINATION, the gluing or faſtening any two bodies together by the intromiſſion of a third, whoſe parts are unctuous and tenacious, in the nature of glue. See the article Glue.

CONGREGATION, an aſſembly of ſeveral eccleſiaſtics united, ſo as to conſtitute one body.

Congregation is alſo uſed for a company or ſociety of religious, cantoned out of any order, ſo as to make a ſubdiviſion of the order itſelf.

Congregation is likewiſe uſed for aſſemblies of pious perſons, in manner of fraternities.

CONGREGATIONALISTS, in church hiſtory, a ſect of proteſtants who reject all church-government, except that of a ſingle congregation. In other matters, they agree with the preſbyterians.

CONGRESS, in political affairs, an aſſembly of commiſſioners, envoys, deputies, &c. from ſeveral courts, meeting to concert matters for their common good.

CONGRUITY, in the ſchools, a ſuitableneſs or relation of agreement between things.

Congruity, in geometry, is applied to figures, lines, &c. which being laid upon each other, exactly agree in all their parts, as having the very ſame dimenſions.

Congruity, among naturaliſts, a property relative to a fluid body, whereby any part of it is readily united with any other part, either of itſelf, or of any other ſimilar fluid, or ſolid body.

CONIC-Sections, curves formed from the ſection of a cone by a plane. The curves generally called conic-ſections are three, viz. the ellipſis, parabola, and hyperbola; for though the triangle and circle are formed from the ſection of a cone, as we ſhall preſently ſhew, they are not uſually conſidered in that capacity.

If a right cone be cut directly through its axis, the plane or ſuperficies of that ſection will be a plane iſoſceles triangle, as H V G (plate XLIV. *fig.* 6.); to wit, H V and V G, the ſides of the cone, will be the ſides of the triangle; H G the diameter of the cone's baſe will be the baſe of the triangle; and its axis V C will be the perpendicular height of the triangle.

If a right cone be cut any where off by a right line parallel to its baſe, the plane of that ſection will be a circle, becauſe the cone's baſe is ſuch.

If a right cone be any where cut off by a right line that cuts both its ſides, but not parallel to its baſe, as T S, the plane of that ſection will be an ellipſis, that is, an oblong or imperfect circle, having ſeveral diameters and two particular centers: for any right line that divides an ellipſis into two equal parts, is called a diameter; amongſt which the longeſt and the ſhorteſt are particularly diſtinguiſhed from the reſt, as being of moſt general uſe: the others are only applicable to particular caſes: the longeſt diameter, as T S, is called the tranſverſe diameter or tranſverſe axis; being that right line which is drawn through the middle of the ellipſis, and ſhews its length. The ſhorteſt diameter, called the conjugate diameter, is a right line that interſects the tranſverſe diameter at right angles, in the common center of the ellipſis, as N *n*, and limits the breadth of the ellipſis.

The two points, called particular centers of an ellipſis, are two points in the tranſverſe diameter, at an equal diſtance each way from the conjugate diameter, and are uſually called nodes, focus's, or burning points.

All right lines within the ellipſis that are parallel to one another, and can be divided into two equal parts, are called ordinates, with reſpect to that diameter which divides them: and if they are parallel to the conjugate, namely, at right angles to the tranſverſe diameter, then they are called ordinates rightly applied; and thoſe two that paſs through the focus's are remarkable above any of the reſt, which being equal and ſituated alike, are both called the latus-rectum, or right parameter, by which all the ordinates are regulated and valued. If any cone be cut into two parts, by a right line parallel to one of its ſides, as S A (*fig.* 7.) the plane of that ſection, namely, S *b* B A B *b*, is called a parabola. A right line being drawn through the middle of any parabola, as S A, is called its axis, or intercepted diameter. All right lines that interſect the axis at right angles, as B B and *b b*, which are ſuppoſed to croſs S A, are called ordinates rightly applied, as in the ellipſis; and the greateſt ordinate, as B B, which limits the length of the parabola's axis S A, is uſually called the baſe of the parabola; that ordinate which paſſes through the focus of the parabola, is called the latus rectum or right parameter, as in the ellipſis, becauſe by it all the ordinates are proportioned, and may thereby be found. The focus of the parabola is a point in its axis, which is diſtant from the vertex or top of the ſection, namely, from S, juſt one fourth part of the latus rectum. All right lines drawn within a parabola parallel to its axis, are called diameters; and every right line that any of thoſe diameters cut into two equal parts, is ſaid to be an ordinate to that diameter which biſects it.

If a cone be any where cut by a right line, either parallel to its axis, as S A (*fig.* 8.) or otherwiſe as *x* N, in ſuch a manner that the interſecting line, when continued through one ſide of the cone, as at S or *x*, will meet with the other ſide of the cone, if it be continued beyond the vertex V, as at T; then is the plane of that ſection, namely S *b* B A B *b*, called an hyperbola. A right line drawn through the middle of any hyperbola, namely, within the ſection, as S A or *x* N, is called the axis or intercepted diameter, as in the parabola; and that part of it which is produced out of the ſection, until it meet with the other ſide of the cone continued, to wit, T S, or T *x*, &c. is called the tranſverſe diameter or tranſverſe axis of the hyperbola. All right lines that are drawn within an hyperbola at right angles to its axis, are called ordinates rightly applied, as in the ellipſis and parabola. That ordinate which paſſes through the focus of the hyperbola is called the latus rectum or right parameter, as in the other ſections. The middle point of the tranſverſe diameter is called the center of the hyperbola, from whence may be drawn two right lines out of the ſection, called aſymptotes, becauſe they will always incline nearer and nearer to both ſides of the hyperbola, but never meet with or touch them, though both they and the ſides of the hyperbola were infinitely extended.

The principal equations defining the nature of theſe ſections may be thus determined. Let A B C (*fig.* 9.) be a cone ſtanding on a circular baſe B C, and I E M its ſection ſought; and let K I L M be any other ſection parallel to the baſe, and meeting the former ſection in H I; and A B C a third ſection, perpendicularly biſecting the two former in E H and K L, and the cone in the triangle A B C: and producing E H till it meet A K in D, and having drawn E F and D G, parallel to K L, and meeting A B and A C in F and G, call E F, *a*, D G, *b*, D E, *c*, E H, *x*, and H I, *y*; the triangles E H L, E D G, are ſimilar, whence E D : D G : : E H : H L $= \frac{bx}{c}$: and by reaſon of the ſimilar triangles D E F, D H K, we have D E : E F : : D H : ($c-x$ in the figure, and $c+x$ in the figure) H K $= \frac{ac \overset{-}{+} ax}{c}$. Laſtly, ſince the ſection K I L is parallel to the baſe, and conſequently circular, H K × H L will be $= \overline{HI}^2$, that is, $\frac{ab}{c}x \overset{-}{+} \frac{ab}{cc}xx = yy$, an equation which expreſſes the relation between E H (x) and H I (y) that is, between the axis and the ordinate of the ſection E I M; which equation, ſince it expreſſes an ellipſis in the figure, and an hyperbola in the figure, it is evident that the ſection will be elliptical or hyperbolical.

Now if E D no where meets A K, being parallel to it, then c becomes infinite, and conſequently $\frac{ab}{cc}$ infinitely leſs than $\frac{ab}{c}$; therefore $\frac{ab}{cc}xx$ may be rejected, whence $\frac{ab}{c}x = yy$: but in this circumſtance $b = c$, and thence $ax = yy$, an equation expreſſing a parabola.

When E coincides with the vertex A, then H E D paſſes through A, and biſects G D, whence our equation becomes $\frac{aaxx}{4cc} = yy$; whence $\frac{ax}{2c} = y$, an equation relating to a right-lined iſoſceles triangle.

From what has been ſaid, we may obſerve how one ſection degenerates into another: for an ellipſis being that plane of any ſection of the cone which is between the circle and parabola, it will be eaſy to conceive that there may be great variety of ellipſes produced from the ſame cone; then the ellipſis degenerates into a parabola. Now a parabola being that ſection whoſe plane is always exactly parallel to the ſide of the cone, cannot vary as the ellipſis may: for ſo ſoon as ever it begins to move out of that poſition, of being parallel to the cone's ſide, it degenerates either into an ellipſis or an hyperbola; that is, if the ſection inclines towards the plane of the cone's baſe, it becomes an ellipſis; but if it inclines towards the cone's vertex, then it becomes an hyperbola, which is the plane of any ſection that falls between the parabola and the triangle: and therefore there may be as many varieties of hyperbolas produced from one and the ſame cone, as there may be ellipſes. From whence it follows, that the conic ſections are in themſelves a ſyſtem of regular curves, naturally allied to each other, and that one is changed into another perpetually, when it is either increaſed, or diminiſhed, in infinitum.

Thus the circle, the curvature thereof being never ſo little increaſed or diminiſhed, paſſes into an ellipſis; and the ellipſis, its center going away infinitely, and the curvature being by that means diminiſhed, is turned into a parabola; and when the curvature of the parabola is never ſo little changed, there ariſeth the firſt of the hyperbolas, the ſpecies whereof, which are innumerable, will all of them ariſe orderly by a gradual diminution of the curvature, till the curvature vaniſhing away, the laſt hyperbola ends in a right line perpendicular to the axis: from whence it is manifeſt, that every regular curvature, like that of a circle, from the circle itſelf to a right line, is a conical curvature, and is diſtinguiſhed with its peculiar name, according to the divers degrees of that curvature.

All diameters in a circle and ellipſis interſect one another in the center of the figure within the ſection. In the parabola they are all parallel amongſt themſelves and to the axis; but in the hyperbola they interſect one another, but this without the ſection, in the common center of the oppoſite ſections.

The curvature with reſpect to the focus, in all theſe figures, is increaſed or diminiſhed proportionably.

For the geneſis and moſt eſſential properties of the conic-ſections, ſee the articles ELLIPSIS, HYPERBOLA, and PARABOLA.

CONICHTHYODONTES, or PLECTRONITÆ, in natural hiſtory, one of the three names by which the foſſile teeth of fiſhes are known.

CONIFEROUS-TREES, in gardening, ſuch as bear hard, dry ſeed-veſſels of a conical figure, conſiſting of ſeveral woody parts, being moſtly ſcaly, adhering cloſely together, and ſeparating when ripe.

Of this ſort is the cedar of Lebanon, fir, pine, &c.

The word is formed from the Latin, *conus*, a cone, and *fero*, to bear.

CONISSALÆ, in natural hiſtory, a claſs of foſſils, naturally and eſſentially compounded, not inflammable, nor ſoluble in water; found in detached maſſes, and formed of cryſtalline matter debaſed by earth.

CONJUGATE DIAMETER, or *Axis of an Ellipſis*, the ſhorteſt of the two diameters, or that biſecting the tranſverſe axis. See the article AXIS.

CONJUGATE HYPERBOLAS. If there be two oppoſite hyperbolas AM, *am*, (plate XLIV. *fig.* 10.) whoſe principal axis is the line A *a*, and conjugate axis the line B *b*; and if there be two other hyperbolas, whoſe principal axis is the line B *b*, and conjugate one the line A *a*; then theſe four hyperbolas are called conjugate hyperbolas; the two former oppoſite ones being conjugates to the latter.

CONJUGATION, in grammar, a regular diſtribution of the ſeveral inflexions of verbs in their different voices, moods, tenſes, numbers and perſons, ſo as to diſtinguiſh them from one another.

The Latins have four conjugations, diſtinguiſhed by the terminations of the infinitive *āre*, *ēre*, *ĕre*, and *īre*; the vowels before *re* of the infinitive in the firſt, ſecond, and fourth conjugations being long vowels, and that before *re* in the infinitive of the third being a ſhort one. See the article VOWEL.

The Engliſh have ſcarce any natural inflexions, deriving all their variations from additional particles, pronouns, &c. whence there is ſcarce any ſuch thing as ſtrict conjugations in that language.

The French grammarians reduce the number of conjugations in their language to that in the Latin, and theſe terminating in *er*, *re*, *ir*, and *oir*.

CONJUGATION, in anatomy, is applied to a pair of nerves ariſing together, and ſerving the ſame operation, ſenſation, and motion.

CONJUNCTION, in aſtronomy, the meeting of two ſtars or planets in the ſame degree of the zodiac.

This conjunction is either true, or apparent. The true conjunction is when a right line, drawn from the eye through the center of one of the bodies, would paſs thro' that of the other: in this caſe the bodies are in the ſame degree of longitude and latitude: and here the conjunction is alſo ſaid to be central, if the ſame line, continued from the two centers through the eye, do alſo paſs thro' the center of the earth.

Apparent conjunction is when the two bodies do not meet preciſely in the ſame point, but are joined with ſome latitude.

In this caſe a right line, drawn through the center of the two bodies, would not paſs through the center of the earth, but through the eye of the ſpectator: this conjunction is alſo called partile.

The moon is in conjunction with the ſun, when they meet in the ſame point of the ecliptic, which happens every month; and eclipſes of the ſun are always occaſioned by the conjunction of the ſun and moon in or near the nodes of the ecliptic.

CONJUNCTION, in grammar, an undeclinable word, or particle, which ſerves to join words and ſentences together, and thereby ſhews their relation or dependence one upon another. The conjunction, which is uſually placed laſt in the eight parts of ſpeech, is of great uſe to render the diſcourſe ſmooth and fluent, and ſerves many good purpoſes in the argumentative or narrative ſtyle; but ſhould ever be omitted where a perſon ſpeaks with emotion, as only ſerving to weaken and enervate it. Conjunctions are of ſeveral kinds.

Adverſative CONJUNCTIONS, ſuch as are reſtrictive, or expreſſive of contrarieties; as, *but*, *nevertheleſs*, *although*.

Cauſal CONJUNCTIONS, ſuch as expreſs the reaſon of ſomething advanced; as, *for*, *becauſe*, *ſeeing*, *inaſmuch as*.

Concluſive CONJUNCTIONS, ſuch as ſhew that a conſequence is drawn; as, *of conſequence*, *for which reaſon*, *but then*, *ſo that*.

Conditional CONJUNCTIONS, thoſe that denote a condition; as, *on condition that*, *if*, *if not*, *in caſe of*, *provided that*.

Copulative CONJUNCTIONS, ſuch as ſhew a compariſon, or expreſs a relation of union between two things; as, *and*, *only*, *as much as*, *in the ſame manner as*, *not only*, *inaſmuch as*, *but alſo*, *neither more nor leſs*.

Continuative CONJUNCTIONS, ſuch as denote a ſucceſſion or continuation of the diſcourſe; as, *whatever it be*, *even*, *in effect*.

Disjunctive CONJUNCTIONS, ſuch as import a relation of ſeparation or diviſion; as, *neither*, *whether*, *or*.

Dubitative CONJUNCTIONS, ſuch as expreſs ſome doubt, or ſuſpenſion of opinion; as, *if*, *that is to ſay*, *&c.*

CONJURATION, magic words, characters, or ceremonies, whereby evil ſpirits, tempeſts, &c. are ſuppoſed to be raiſed, or driven away.

CONNECTICUT, a Britiſh colony of North America, bounded by the Maſſachuſet colony on the north-eaſt; by the ſea, on the ſouth; and by New-York, on the weſt; being about one hundred miles in length, and eighty in breadth.

This colony conſtitutes a diſtinct government, of a different form from that of New England.

CONNECTION, or CONNEXION, the relation whereby one thing adheres to, or depends upon, another. Such is the relation between Euclid's propoſitions, that the latter cannot ſubſiſt but by its connection with the former.

CONNECTION, or CONTINUITY, in the drama, conſiſts in the joining of the ſeveral ſcenes together.

The connection is ſaid to be obſerved, when the ſcenes of an act ſucceed one another immediately, and are ſo joined, as that the ſtage is never left empty.

CONNIVENT Valves, in anatomy, thoſe wrinkles, cellules, and vaſcules, which are found in the inſide of the two great inteſtines, the ilium and jejunum.

The inner tunic of the guts, being longer than the middle or the outward tunic, does frequently wrinkle, or bag out, in many places, by which means the paſſage for the contents become ſtraitened, and the matter through the guts then deſcends more ſlowly, ſo that the lacteals have the more time to imbibe the chyle.

CONNOISSEUR, a French word much uſed of late in Engliſh, to ſignify a perſon well verſed in any thing: whence it is uſed for a critic, or a perſon who is a thorough judge of any ſubject.

CONOCARPUS, the button-tree, in botany, a genus of plants, having no corolla, nor any pericarpium diſtinct from the ſeed, which is naked and ſingle, having on each ſide a prominent, membranaceous margin.

CONOID, in geometry, a ſolid body, generated by the revolution of a conic-ſection about its axis.

Elliptical Conoid, is a ſolid formed by the revolution of an ellipſis about one of its diameters, and more generally called a ſpheroid. See the article Spheroid.

Parabolical Conoid, is generated by the revolution of a parabola about its axis. See the article Parabola.

Hyperbolical Conoid, is generated by the revolution of an hyperbola about its axis. See the article Hyperbola.

CONOIDES, in anatomy, a gland found in the third ventricle of the brain, called pinealis, from its reſemblance to a pine-apple. Deſcartes fixed the ſeat of the rational ſoul in this gland. See the article Brain.

CONSANGUINITY, the relation ſubſiſting between perſons of the ſame blood, or who are ſprung from the ſame root.

CONSCIENCE, in ethics, a ſecret teſtimony of the ſoul, whereby it gives its approbation to things that are naturally good, and condemns thoſe that are evil. When it judges of an action to be performed, it is called in the ſchools an antecedent conſcience; and when it paſſes ſentence on an action which is performed, it is called a ſubſequent conſcience. When the mind is ignorant or uncertain about the moment of an action, or its tendency to good; or when there are ſeveral circumſtances in the caſe, ſome of which being doubtful, render the mind dubious concerning the morality of an action, this is called a doubtful or ſcrupulous conſcience; and if it miſtakes concerning theſe, it is called an erroneous conſcience. If the error or ignorance is involuntary or invincible, the action proceeding from that error, or from that ignorance, is reckoned innocent. But if they are the effect of negligence, or of affectation, the conduct flowing from ſuch error is criminal. Not to follow one's conſcience, though erroneous and ill-informed, Mr Hutcheſon likewiſe reckons criminal, as it is the guide of life, and to counteract it ſhews an incorrigible ſpirit; yet to follow an erroneous conſcience, is likewiſe criminal, if the error which miſled the conſcience was the effect of inattention, or of any criminal paſſion.

Some divines maintain that conſcience is infallible, and hold it to be that immutable law by which God will judge men. They deny that the underſtanding can be the ſource of errors, and lay them all at the door of the will.

CONSCRIBED, a term uſed by ſome geometricians for circumſcribed.

CONSCRIPT, *Conſcriptus*, in Roman antiquity, an appellation given to the ſenators of Rome, who were called conſcript-fathers, on account of their names being entered all in one regiſter.

CONSECRATION, the act of devoting any thing to the ſervice and worſhip of God. The Moſaical law ordained, that all the firſt-born, both of men and beaſt, ſhould be ſanctified or conſecrated to God. We find alſo, that Joſhua conſecrated the Gibeonites, as Solomon and David did the Nethinims, to the ſervice of the temple; and that the Hebrews ſometimes conſecrated their fields and cattle to the Lord, after which they were no longer in their power.

Among the ancient Chriſtians, the conſecration of churches was performed with a great deal of pious ſolemnity. In what manner it was done for the three firſt ages, is uncertain; the authentic accounts reaching no higher than the fourth, when, in the peaceable reign of Conſtantine, churches were every where built, and dedicated with great ſolemnity. Some think the conſecration conſiſted in ſetting up the ſign of the croſs, or in placing a communion table in the church; and others, that no more was done than preaching a panegyrical ſermon in commemoration of the founder, and that then they proceeded to prayers, one of which was compoſed on purpoſe for the church to be conſecrated. The Romaniſts have a great deal of pious foppery in the ceremonies of conſecration; which they beſtow on almoſt every thing, as bells, candles, books, water, oil, aſhes, palms, ſwords, banners, pictures, croſſes, agnus deis, roſes, children's clouts, &c.

In England, churches have been always conſecrated with particular ceremonies, the form of which was left to the diſcretion of the biſhop. That obſerved by biſhop Laud, in conſecrating St. Catharine Creed church, in London, gave great offence.

Consecration is particularly uſed for the benediction of the elements in the euchariſt.

CONSECTARY, a deduction, or conſequence, drawn from a preceding propoſition. Some rather chooſe to call it a conſequence, and others a corollary.

CONSENT *of Parts*, in the animal œconomy, an agreement or ſympathy, whereby when one part is immediately affected, another, at a diſtance, becomes affected in the ſame manner.

CONSEQUENCE, in logic, the concluſion, or what reſults from reaſon or argument. See Conclusion.

The conſequence is that other propoſition in which the extremes or premiſes of a ſyllogiſm are joined, or ſeparated; and is gained from what was aſſerted in the premiſes.

This word, in a more reſtrained ſenſe, is uſed for the relation or connection between two propoſitions, whereof one is inferred from the other.

CONSEQUENT, ſomething deduced or gathered from a former argumentation. But, in a more preciſe ſenſe, it is uſed for the propoſition which contains the concluſion, conſidered in itſelf, without any regard to the antecedent: in which ſenſe the conſequent may be true, though the conſequence be falſe. See the preceding article.

Consequent *of a Ratio*, in mathematics, the latter of the two terms of a ratio, or that to which the antecedent is compared; thus in m to n, n is the conſequent, and m the antecedent. See the articles Ratio and Proportion.

CONSERVATOR, an officer ordained for the ſecurity and preſervation of the privileges of ſome cities and communities, having a commiſſion to judge of, and determine the differences among them.

Conservator *of the Peace*, in our ancient cuſtoms, a perſon who had a ſpecial charge to keep the king's peace.

CONSERVATORY, a term ſometimes uſed for a green-houſe, or ice-houſe. See Green-house and Ice-house.

CONSERVE, in pharmacy, a form of medicine, contrived to preſerve the flowers, herbs, roots, or fruits, of ſeveral ſimples, as near as poſſible to what they are when freſh gathered.

Conſerves are made up by beating up the thing to be preſerved with ſugar, viz. a triple quantity thereof to thoſe that are moſt moiſt, and a double quantity to thoſe that are leaſt ſo.

CONSIDERATION, in law, material cauſes or ground of a contract, without which the party contracting would not be bound.

CONSIGNMENT, in law, the depoſiting any ſum of money, bills, papers, or commodities in good hands; either by appointment of a court of juſtice, in order to be delivered to the perſons to whom they are adjudged; or voluntarily, in order to their being remitted to the perſons they belong to, or ſent to the places they are deſigned for.

Consignment *of Goods*, in commerce, is the delivering or making them over to another: thus, goods are ſaid to be conſigned to a factor, when they are ſent to him to be ſold, &c. or when a factor ſends back goods to his principal, they are ſaid to be conſigned to him.

CONSISTENT *Bodies*, a term frequently uſed by Mr. Boyle, to ſignify ſuch bodies whoſe parts are firmly united together, ſo that they do not ſo eaſily ſlide over one another's ſurfaces as the parts of fluid bodies do.

CONSISTENTES, in church-hiſtory, an appellation given to ſuch penitents as were permitted to aſſiſt at prayers, but not to partake of the Sacrament.

CONSISTORY, at Rome, is an eccleſiaſtical aſſembly held in the preſence of the pope, for the reception of princes, or their ambaſſadors, for the canonization of ſaints, for the promotion of cardinals, and other important affairs.

CONSISTORIES, among the Jews, were courts of judicature, conſiſting of twenty-three perſons, who were appointed to ſit in judgment upon the lives and fortunes of the people, and decide all cauſes, a few only excepted.

CONSOLATION, a figure in rhetoric, wherein the orator endeavours to moderate the grief of another. A principal regard is always to be had to the circumſtances and relations of the parties: thus, a ſuperior may interpoſe his authority, and even chide: a wiſe man may diſpute, ſentences will become him: an inferior is to ſhew reſpect and affection, and even that he had this from ſome wiſe or learned perſon: and an equal is to appeal to their common friendſhip.

CONSOLE, in architecture, an ornament cut upon the key of an arch, which has a projecture, and, on occaſion, ſerves to ſupport little corniches, figures, buſts, and vaſes. They are alſo called mutules and modillions, according to their form. Some of them are ſtriated, others in form of cartouches, others have drops in form of triglyphs. Thoſe made at the end of a plank of wood, cut triangularwiſe, are called ancones. See ANCONE.

Mr. Le Clerc is of opinion that a conſole ſhould always have ſomething maſſive to ſuſtain, and ſerve it as a reſt.

CONSONANCE, in muſic, is ordinarily uſed in the ſame ſenſe with concord, viz. for the union or agreement of two ſounds produced at the ſame time, the one grave and the other accute; which mingling in the air in a certain proportion, occaſions an accord agreeable to the ear.

Moſt authors confound conſonance and concord together, though ſome of the more accurate diſtinguiſh them, making conſonance a mere ſounding of two notes together, or in the ſame time, in contradiſtinction to the motion of thoſe ſounds in ſucceſſion, or one after the other. In effect, the two notions coincide; for two notes thus played in conſonance, conſtitute concord; and two notes that pleaſe the ear in conſonance, will pleaſe it in ſucceſſion.

Notes in conſonance conſtitute harmony, as notes in ſucceſſion conſtitute melody.

In the popular ſenſe, conſonances are either ſimple or compound. The moſt perfect is uniſon; though many authors, both among the ancients and moderns, diſcard it from the number of conſonances, as conceiving conſonances an agreeable mixture of grave and acute ſounds, and not a repetition of the ſame ſound. The firſt conſonance is the octave, then the fifths, the fourths, the thirds, and ſixths: the reſt are multiples, or repetitions of theſe.

CONSONANCE, in grammar, ſignifies a like cadence of words and periods, a fault to be avoided in Engliſh, though the ancients make a figure of them, which they call ομοιοτελευτον.

CONSONANT, a letter that cannot be ſounded without ſome ſingle or double vowel before or after it.

Conſonants are firſt divided into ſingle and double; the double are *x* and *z*, the reſt are all ſingle, and theſe are again divided into mutes and liquids; eleven mutes, *b*, *c*, *d*, *f*, *v*, *g*, *j*, *k*, *p*, *q*, *t*, and four liquids, *l*, *m*, *n*, *r*. But the moſt natural diviſion of conſonants is that of the Hebrew grammarians, who have been imitated by the grammarians of other oriental languages. Theſe divide the conſonants into five claſſes, with regard to the five principal organs of the voice, which all contribute, it is true, but one more notably than the reſt, to certain modifications which make five general kinds of conſonants. Each claſs comprehends ſeveral conſonants, which reſult from the different degrees of the ſame modifications, or from the different motions of the ſame organs: theſe organs are the throat, palate, tongue, teeth, lips; whence the five claſſes of conſonants are denominated guttural, palatal, lingual, dental, and labial.

The abbe Dangeau thinks the nature of the diviſion of the Hebrew grammarians very reaſonable, but he does not acquieſce in the diſtribution they have made of them. In order to find a natural and juſt diviſion of the conſonants, he obſerves, no regard muſt be had to the characters that repreſent them, nor any thing to be conſidered but their ſound, or the modification they give the ſound. On this principle the ſame author finds in the French five labial conſonants, *b*, *p*, *v*, *f*, *m*; five palatal ones, *d*, *ſ*, *g*, *k*, *n*; four hiſſers, *ſ*, *z*, *j*, *ch*; two liquids, *l* and *r*; two that mix with each other *ll*, *gn*; and the *h* aſpirate.

He adds, 1. That *m* and *n* are properly two naſal conſonants, the *m* ſounding like a *b* paſſed through the noſe, and the *n* like a *d* pronounced through the noſe.

2. That among the conſonants ſome are weak, others ſtrong; their difference conſiſting in this, that the former are preceded by a ſmall emiſſion of the voice, that ſoftens them, which the latter have not: the weak are *b*, *c*, *d*, *g*, *z*, *j*; the ſtrong are *p*, *f*, *k*, *t*, *ſ*, *ch*: hence we may conclude, that the exceſs of conſonants in one language above another only conſiſts in this, that there are more modifications of ſound eſtabliſhed in the one than in the other: for all men having the ſame organs, may form the ſame modifications; ſo that it is entirely owing to cuſtom, nothing to nature, that the Engliſh have not the ϑ of the Greeks, the y and ח of the Hebrews, the ch of the Germans, the *gn* of the French, the *gl* of the Italians, and the *ll* of the Welch. Alſo that the Chineſe have no *r*, the Iroquois no labial conſonants, the Hurons abundance of aſpirates, and the Arabs and Georgians abundance of double conſonants. Laſtly, to find all the conſonants that may be formed in any language. there needs nothing but to obſerve all the modifications that the ſounds of ſpeech will admit of, by which we ſhall have all the conſonants practicable.

Queen CONSORT is ſaid in contradiſtinction to a ſovereign princeſs, or queen inveſted with ſupreme authority. See the article QUEEN.

CONSPIRACY, in law, ſignifies an agreement between two or more, falſely to indict, or procure to be indicted, an innocent perſon of felony.

CONSPIRATORS are, by ſtatute, defined to be ſuch as bind themſelves by oath, covenant, or other alliance, to aſſiſt one another, falſely and maliciouſly to indict perſons, or falſely to maintain pleas. Likewiſe thoſe that retain men in the countries with liveries or fees, in order to ſupport their malicious enterprizes, which extends as well to the takers as the givers, and to ſtewards and bailiffs of lords, who, by their office or power, take upon them to maintain quarrels.

Conſpirators in treaſon are thoſe that plot againſt the king and government.

CONSPIRING POWERS, in mechanics, thoſe acting in directions not oppoſite. See the article POWER.

CONSTABLE. Lord high conſtable, an ancient officer of the crowns both of England and France, whoſe authority was ſo very extenſive, that the office has been laid aſide in both kingdoms, except on particular occaſions, ſuch as the king's coronation. The conſtable of France had his perſon privileged, and, during the king's minority, was named next to the princes of the blood. The army obeyed him next the king: he managed all that belonged to war, either for puniſhment of delinquents, diſtribution of booty, ſurrender of places, &c. The juriſdiction and functions of this office are now in the marſhals of France.

The function of the conſtable of England conſiſted in the care of the common peace of the land, in deeds of arms and matters of war. By a law of Richard II. the conſtable of England has the determination of things concerning wars and blazonry of arms, which cannot be diſcuſſed by the common law. The firſt conſtable was created by the Conqueror: the office continued hereditary till the thirteenth of Henry VIII. when it was laid aſide, as being ſo powerful as to become troubleſome to the king. We have alſo conſtables denominated from particular places, as conſtables of the Tower, of Dover-caſtle, of Windſor-caſtle, of the caſtle of Caernarvon, and many other of the caſtles of Wales, whoſe office is the ſame with that of the caſtellani, or governors of caſtles.

From the lord-high conſtable are derived thoſe inferior ones, ſince called the conſtables of hundreds or franchiſes, who were firſt ordained in the thirteenth of Edward I. by the ſtatute of Wincheſter, which, for the conſervation of peace and view of armour, appointed that two conſtables ſhould be choſen in every hundred. Theſe are what we now call high-conſtables, on account that the increaſe of people and offences has made it neceſſary to appoint others under theſe, in every town, called petty-conſtables, who are of the like nature, though of inferior authority to the other. The high-conſtable over the whole hundred is uſually choſen and ſworn into his office by the juſtices of the peace, in their ſeſſions: and as to petty-conſtables in towns, villages, &c. the right of chooſing them belongs to the court-leet, though they may be elected by the pariſhioners. They are appointed yearly, and ought to be men of honeſty, knowledge, and ability; and if they refuſe to ſerve, or do not perform their duty, they may be bound over to the ſeſſions, and there indicted and fined.

CONSTANT, in general, an appellation given to things which remain in the ſame ſtate, without changing their nature or circumſtances: thus we ſay, conſtant quantities, conſtant winds, &c. See the articles QUANTITY, WINDS, &c.

CONSTANTINOPLE, the metropolis of the Turkiſh empire, called by the Turks themſelves Stamboul, and by many Europeans the Porte, being one of the beſt harbours in Europe: eaſt long. 29°, 15′, and north lat. 41°, 30′.

It is built on the weſtern ſhore of the Boſphorus, in the form of a triangle; the ſeraglio, or palace, occupying that angle which runs out between the Propontis and harbour; and underneath the palace are the gardens, which extend to the water-ſide.

CONSTAT, in law, a certificate that the clerk of the pipe and auditors of the exchequer grant at the requeſt of any perſon who intends to plead or move in that court for the diſcharge of any thing. A conſtat is ſuperior to an ordinary certificate, becauſe it contains nothing but what is evident on record.

CONSTELLATION, in aſtronomy, a ſyſtem of ſeveral ſtars that are ſeen in the heavens, near to one another. Aſtronomers not only mark out the ſtars, but that they may better bring them into order, they diſtinguiſh them by their ſituation and poſition in reſpect to each other; and therefore they diſtribute them into aſteriſms, or conſtellations, allowing ſeveral ſtars to make up one conſtellation: and for the better diſtinguiſhing and obſerving them, they reduce the conſtellations to the forms of animals, as men, bulls, bears, &c. or to the images of ſome things known, as of a crown, a harp, a balance, &c. or give them the names of thoſe, whoſe memories, in conſideration of ſome notable exploit, they had a mind to tranſmit to future ages. The venerable Bede, indeed, out of a vain zeal, inſtead of the names and figures of the twelve conſtellations, ſubſtituted thoſe of the twelve apoſtles; Julius Schillerius, in 1627, completed the reformation, and gave ſcripture-names to all the conſtellations in the heavens. But as theſe innovations could ſerve no purpoſe, but that of introducing quarrels into aſtronomy, the old conſtellations are ſtill retained, both becauſe better could not be ſubſtituted, and likewiſe to keep up the greater correſpondence and uniformity between the old aſtronomy and the new.

The diviſion of the ſtars by images and figures is of great antiquity, and ſeems to be as old as aſtronomy itſelf; for in the moſt ancient book of Job, Orion, Arcturus, and the Pleiades are mentioned; and we meet with the names of many of the conſtellations in the writings of the firſt poets Homer and Heſiod.

The ancients, in their diviſion of the firmament, took in only ſo much as came under their notice, diſtributing it into forty-eight conſtellations; but the modern aſtronomers comprehend the whole ſtarry firmament, dividing it into three regions: 1. The zodiac, or that portion of the heavens in which the planets would appear to move, to an eye placed in the ſun: the breadth of this ſpace depends on the inclination of the orbits, in which the planets move, to one another; and includes twelve conſtellations, commonly called the ſigns of the zodiac, viz. Aries, Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricornus, Aquarius, and Piſces. 2. All that region of the heavens that lies on the north-ſide of the zodiac, which contains twenty-one conſtellations, namely, the Urſa Minor and Major, Draco, Cepheus, Bootes, Corona Septentrionalis, Hercules, Lyra, Cygnus, Caſſiopeia, Perſeus, Andromeda, Triangulum, Auriga, Pegaſus, Equuleus, Delphinus, Sagitta, Aquila, Serpentarius, and Serpens; to which were added afterwards two others, viz. that of Antinous, which was made of the ſtars not included in any image, near the eagle; and Berenice's hair, conſiſting of ſtars which are near the lion's tail. 3. That region on the ſouthern-ſide of the zodiac, which contains fifteen conſtellations, known to the ancients, viz. Cetus, the Eridanus, Lepus, Orion, Canis Major, Canis Minor, Argo, Hydra, Crater, Corvus, Centaurus, Lupus, Ara, Corona Meridionalis, and Piſcis Auſtralis: to theſe are lately added twelve more conſtellations, which are not to be ſeen by us, who inhabit the northern regions, becauſe of the convexity of the earth, but in the ſouthern parts they are very conſpicuous; theſe are the Phœnix, Grus, Pavo, Indus, Avis Paradiſi, Triangulum Auſtrale, Muſca, Chameleon, Piſcis Volans, Toucan, Hydrus, Xiphias. The Galaxy, or Milky-way, is alſo to be reckoned among the conſtellations. See each conſtellation, and the number of ſtars it contains, under its proper head, ARIES, TAURUS, &c.

Without the compaſs of theſe conſtellations there are ſeveral ſtars which cannot be reduced to any of the forms mentioned, and theſe by the ancients are called Informes or Sporades; out of which ſome great aſtronomers have made new conſtellations, as Charles's-heart and Sobieſki's ſhield. See the articles INFORMES and SPORADES.

CONSTIPATION, in medicine, a hardneſs of the belly, with great coſtiveneſs.

CONSTITUENT PART, in phyſiology, an eſſential part in the compoſition of any thing, differing little from what is otherwiſe called element or principle.

CONSTITUTION, in matters of policy, ſignifies the form of government eſtabliſhed in any country or kingdom.

CONSTITUTION alſo denotes an ordinance, deciſion, regulation, or law, made by authority of any ſuperior, eccleſiaſtical or civil.

Apoſtolical CONSTITUTIONS, a collection of regulations attributed to the apoſtles, and ſuppoſed to have been collected by St. Clement, whoſe name they likewiſe bear. It is the general opinion, however, that they are ſpurious, and that St. Clement had no hand in them. They appeared firſt in the fourth age, but have been much changed and corrupted ſince that time. They are divided into eight books, conſiſting of a great number of rules and precepts, relating to the duties of Chriſtians, and particularly the ceremonies and diſcipline of the church.

CONSTITUTION, in a phyſical ſenſe, is that particular diſpoſition of the human body, which reſults from the properties and mutual actions of the ſolids and fluids, and which renders them capable of exerciſing the functions proper and conformable to nature. An equal conſtitution is that wherein the four humours, blood, phlegm, bile, and melancholy, are mixed in a due proportion; and according as one or other of theſe predominates, the conſtitution is denominated ſanguine, phlegmatic, bilious, or melancholy and atrabilious.

CONSTRICTOR, an appellation given to ſeveral muſcles on account of their conſtringing or cloſing ſome of the orifices of the body. Thus,

CONSTRICTOR LABIORUM, called alſo orbicularis, becauſe its fibres are of an arched figure, is a muſcle which conſtitutes the very ſubſtance of the lips, and draws them up as in kiſſing; whence it is alſo called baſiator and oſculatorius.

CONSTRICTOR NASI, a muſcle ariſing above the dentes inciſores of the upper jaw, and terminating in the alæ of the noſe. It is but ſingle, though Santorini will have it that it is double, and is not orbicular in human ſubjects as in many of the quadrupeds. Properly ſpeaking, indeed, there is in the human frame no ſuch muſcle as the conſtrictor orbicularis of beaſts, but this ſerves in ſome degree in its office. The uſe is to draw the alæ downwards, and at the ſame time to draw the upper lip downwards, in which action it is very much aſſiſted by the conſtrictor of the lips.

CONSTRUCTION, in geometry, is the drawing ſuch lines, ſuch a figure, &c. as are previouſly neceſſary for the making any demonſtration appear more plain and undeniable.

CONSTRUCTION *of Equations.* For the method of conſtructing equations, ſee the article EQUATIONS.

CONSTRUCTION, in grammar, the connecting the words of a ſentence according to the rules of the language.

Conſtruction is either ſimple or figurative, according as the parts of the diſcourſe are placed in their natural order, or recede from that ſimplicity, when ſhorter and more elegant expreſſions are uſed than the nature of it affords.

The conſtruction of words, called ſyntax, is diſtinguiſhed into two parts, concord and regimen. See SYNTAX, CONCORD, and REGIMEN.

CONSUBSTANTIAL, among divines, a term denoting ſomething of the ſame ſubſtance with another. Thus the orthodox believe the Son of God to be conſubſtantial with the Father.

CONSUBSTANTIATION, a tenet of the Romiſh and Lutheran churches with regard to the manner of the change made in the bread and wine in the euchariſt.

The divines of both profeſſions maintain, that after conſecration, the body and blood of our Saviour are ſubſtantially preſent, together with the ſubſtance of the bread and wine, which is called conſubſtantiation or impanation.

CONSUL, the chief magiſtrate of the Roman commonwealth. They were two in number, choſen every year in the campus martius, by the people aſſembled in the comitia centuriata.

CONSUL, at preſent, is an officer eſtabliſhed by virtue of a commiſſion from the king and other princes, in all foreign countries of any conſiderable trade, to facilitate and diſpatch buſineſs, and protect the merchants of the nation.

CONSULTATION, in law, a writ by which a cauſe being removed from the ſpiritual court to the king's court, is returned thither again; and the reaſon is, that if the judges of the king's court, by comparing the libel with the ſuggeſtion of the party, find the ſuggeſtion falſe or not proved, and on that account the cauſe to be wrongfully called from the eccleſiaſtical court, then upon this conſultation or deliberation they decree it to be returned.

CONSUMMATION, the end or completion of a work. Thus we ſay, the conſummation of all things, meaning the world.

CONSUMPTION, in medicine. See the article PHTHISIS.

CONTACT, is when one line, plane, or body, is made to touch another; and the parts that thus touch, are called the points or places of contact. The contact of two ſpherical bodies, and of a tangent with the circumference of a circle, is only in one point.

CONTAGION, in phyſic, the communicating a diſeaſe from one body to another, either by contact or morbid effluvia.

CONTARA, a name uſed by ſome botaniſts for the plant that produces the ignatius's beans, uſed in medicine.

CONTEMPLATION, an act of the mind, whereby it applies itſelf to conſider and reflect upon the works of God, nature, &c.

Contemplation, among myſtic divines, is defined a ſimple, amorous view of God as preſent to the ſoul; and is ſaid to conſiſt in acts ſo ſimple, ſo direct, ſo uniform and peaceful, that there is nothing for the mind to take hold of whereby to diſtinguiſh it.

CONTEMPORARY, a perſon or thing that exiſted in the ſame age with another. Thus Socrates, Plato, and Ariſtophanes, were contemporaries.

CONTENEMENT, in our old law books, a term of different import; being ſometimes uſed for credit, or countenance; and, at other times, for the maintenance proper for each perſon, according to his rank and condition in the commonwealth.

CONTENT, in geometry, the area or quantity of matter or ſpace included in certain bounds.

For the contents of veſſels of different kinds, ſee the article GAUGING.

CONTENTIOUS JURISDICTION, in law, denotes a court which has power to decide differences between contending parties.

CONTEXT, among divines and critics, that part of ſcripture or of a writing that precedes and follows the text. See the article TEXT.

CONTIGNATION, in the ancient architecture, the art of laying rafters together, and particularly flooring.

CONTIGUITY, in geometry, is when the ſurface of one body touches that of another.

CONTIGUOUS ANGLES, in geometry, are ſuch as have one leg common to each angle, and are ſometimes called adjoining angles, in contradiſtinction to thoſe produced by continuing their legs through the point of contact, which are called oppoſite or vertical angles. See ANGLE.

CONTINENT, in general, an appellation given to things continued without interruption; in which ſenſe we ſay, continent fever, &c. See the article FEVER.

CONTINENT, in geography, a great extent of land not interrupted by ſeas, in contradiſtinction to Iſland, Peninſula, &c.

According to what relations we have of the diſpoſition of the globe from late navigators, we may count four continents, of which there are but two well known. The firſt, called the ancient continent, comprehends Europe, Aſia, and Africa. The ſecond is the new continent, called America. The third, which is called the Northern or Artic continent, comprehends Greenland, the lands of Spitzberg, Nova Zembla, and the lands of Jeſſo. The fourth comprehends New Guinea, New Zealand, New Holland, and ſeveral others hitherto little known. Some authors think the two firſt continents are in reality only one, imagining the northern parts of Tartary to join with thoſe of North America.

CONTINENT *Cauſe of a Diſtemper,* that upon which the diſeaſe depends ſo immediately, that it continues ſo long as that remains, and no longer.

CONTINENT FEVER, that which proceeds to a criſis without either intermiſſion or remiſſion. See the article SYNOCHUS.

CONTINGENT, ſomething caſual or uncertain. Hence future contingent, in logic, denotes a conditional event which may or may not happen, according as circumſtances fall out. The Socinians maintain, that God cannot foreſee future contingents, becauſe depending on the free motions of the will of man.

CONTINGENT is alſo a term of relation for the quota that falls to any perſon upon a diviſion. Thus each prince in Germany, in time of war, is to furniſh ſo many men, ſo much money and ammunition for his contingent.

CONTINGENT USE, in law, is an uſe limited in a conveyance of lands which may or may not happen to veſt, according to the contingency mentioned in the limitation of the uſe. And a contingent remainder, is when an eſtate is limited to take place at a time to come, on an uncertain event.

CONTINGENT LINE, in dialling, is a line that croſſes the ſubſtyle at right angles. See SUBSTYLE and DIALLING.

CONTINGENTS are ſometimes uſed by mathematicians in the ſame ſenſe as tangents. See the article TANGENT.

CONTINUAL CLAIM, in law, a claim that is made from time to time within every year and a day to lands, &c. which in ſome reſpect one cannot attain without danger.

CONTINUAL PROPORTION. See the article PROPORTION.

CONTINUANTO, a term uſed in a ſpecial declaration of treſpaſs, where the plaintiff would recover damages for ſeveral treſpaſſes in one and the ſame action.

CONTINUATO, in muſic, ſignifies, eſpecially in vocal muſic, to continue or hold on a ſound in an equal ſtrength or manner, or to continue a movement in an equal degree of time all the way.

CONTINUED Proportion, in arithmetic, is that where the conſequent of the firſt ratio is the ſame with the antecedent of the ſecond; as 4 : 8 : 8 : 16, in contradiſtinction to diſcrete proportion. See the article Discrete.

Continued *Thorough Baſs*, in muſic, that which continues to play conſtantly, both during the recitatives, and to ſuſtain the chorus. See the article Chorus.

CONTINUO, in muſic, ſignifies the thorough baſs, as baſſo continuo, is the continual or thorough baſs.

CONTINUOUS Fevers, thoſe otherwiſe called continent. See Continent.

CONTOBABDITES, in church hiſtory, a ſect of heretics in the ſixth century, who allowed of no biſhops.

CONTOUR, in painting, the out-line, or that which defines a figure.

A great part of the ſkill of the painter lies in managing the contours well. Contour, with the Italian painters, ſignifies the lineaments of the face.

CONTOURNE, in heraldry, is uſed when a beaſt is repreſented ſtanding or running with its face to the ſiniſter ſide of the eſcutcheon, they being always ſuppoſed to look to the right, if not otherwiſe expreſſed.

CONTOURNIATED, a term among antiquaries applied to medals, the edges of which appear as if turned in a lathe.

CONTRABAND, in commerce, a prohibited commodity or merchandize bought or ſold, imported or exported, in prejudice to the laws and ordinances of a ſtate, or the public prohibitions of the ſovereign.

Contraband goods are not only liable to confiſcation themſelves, but alſo ſubject all other allowed merchandiſe found with them in the ſame box, bale, or parcel, together with the horſes, waggons, &c. which conduct them. There are contrabands likewiſe, which, beſides the forfeiture of the goods, are attended with ſeveral penalties and diſabilities.

CONTRACT, in a general ſenſe, a mutual conſent of two or more parties, who voluntarily promiſe and oblige themſelves to do ſomething, pay a certain ſum, or the like. All donations, exchanges, leaſes, &c. are ſo many different contracts.

Contract, in common law, an agreement or bargain between two or more perſons with a legal conſideration or cauſe; as where a perſon ſells goods, &c. to another for a ſum of money; or covenants, in conſideration of a certain ſum, or an annual rent, to grant a leaſe of a meſſuage, &c.

Contract is alſo uſed for the inſtrument in writing which ſerves as a proof of the conſent granted, and the obligation paſſed between the parties.

CONTRACTILE Force, that property or power inherent in certain bodies, whereby, when extended, they are enabled to draw themſelves up again to their former dimenſions.

CONTRACTION, in grammar, is the reducing of two ſyllables into one, as *can't* for *cannot*, *ſhould'ſt* for *ſhouldeſt*, *&c.*

Contraction, in logic, a ſort of reduction, whereby things are abridged, or brought into leſs compaſs.

Contraction, in phyſics, the diminiſhing the extent or dimenſions of a body, or the cauſing its parts to approach nearer to each other, in which ſenſe it ſtands oppoſed to dilatation or expanſion.

CONTRADICTION, a ſort of direct oppoſition, wherein one thing is found directly contrary to another.

CONTRADICTORY Propositions, in logic, are ſuch as differ both in quality and quantity, one being univerſal, and the other particular, which conſtitutes the oppoſition of quantity; one affirmative and the other negative, which makes the oppoſition in quality: thus, A. *Every vine is a tree.* O. *Some vine is not a tree.* Theſe can never be both true, and both falſe at the ſame time. To this it is neceſſary that the one deny, and the other affirm, the ſame thing of the ſame ſubject, conſidered in the ſame circumſtances, every thing having always its own eſſence. This logicians expreſs by *affirmare, & negare idem, de eodem ſecundum idem.* If two univerſals differ in quality, they are contradictory; as, A. *Every vine is a tree.* E. *No vine is a tree.* Thoſe can never be both true together, but they may be both falſe. If two particular propoſitions differ in quality only, they are ſubcontradictory; as, J. *Some vine is a tree.* O. *Some vine is not a tree.* Theſe may be both true together, but they can never be both falſe. There are likewiſe contradictory propoſitions on an individual, which are called ſingle contradictories; as, *Peter is juſt, Peter is not juſt.* Now in ſuch as theſe, Peter muſt be conſidered at the ſame time, without which they may be both true; ſince there was a time wherein Peter was juſt, and wherein he was not.

Seeming contradictories is when the members of a period quite diſagree in appearance and ſound, but perfectly agree and are conſiſtent in ſenſe: thus,

> " Cowards die many times before their death;
> " The valiant never taſte of death but once."
>
> Shakespear.

CONTRA-FISSURE, in ſurgery, a kind of fracture, or fiſſure, in the cranium, which ſometimes happens on the ſide oppoſite to that which received the blow; or at leaſt, at ſome diſtance from it.

The moſt certain ſymptoms of a contra-fiſſure are vehement pains, vomitings, vertigo, noiſe in the ears, &c. If theſe happen, and no fracture or depreſſion of the cranium be found, where the wound was received, there is a ſuſpicion of a contra-fiſſure, eſpecially if the patient is apt to point to that part.

If the ſymptoms be by intervals, or not to a great degree, or there be reaſon to believe the fiſſure to have reached only through one of the tables, it is ſufficient to bore down to the diploë, and dreſs with balſamic medicines: but where any violent ſymptoms come on, which demonſtrate an extravaſation of blood in the cavity of the cranium, the trepan is to be called for without delay. See Trepan.

CONTRA-HARMONICAL Proportion, in arithmetic, is that relation of three terms, wherein the difference of the firſt and ſecond is to the difference of the ſecond and third, as the third is to the firſt: thus, 3, 5, and 6, are numbers contra-harmonically proportional, for 2 : 1 :: 6 : 3.

CONTRA-INDICATION, in medicine, an indication which forbids that to be done, which the main ſcope of a diſeaſe points out: as if, in the cure of a diſeaſe, a vomit was judged proper; if the patient be ſubject to a vomiting of blood, it is a ſufficient contra-indication as to its exhibition. See Indication.

CONTRALTO, in muſic, a term uſed by the Italians for two haut contres, becauſe they play contrary to each other. See the article Haut Contre.

CONTRAMURE, in fortification, is a wall built before another partition-wall, to ſtrengthen it, ſo that it may receive no damage from the adjacent buildings. See Wall and Rampart.

CONTRAST, in painting and ſculpture, expreſſes an oppoſition or difference of poſition, attitude, &c. of two or more figures, contrived to make variety in a painting, &c. as where, in a groupe of three figures, one is ſhewn before, another behind, and another ſideways, they are ſaid to be in contraſt.

The contraſt is not only to be obſerved in the poſition of ſeveral figures, but alſo in that of the ſeveral members of the ſame figure: thus, if the right arm advance fartheſt, the right leg is to be hindermoſt; if the eye be directed one way, the arm to go the contrary way, &c. the contraſt muſt be purſued even in the drapery.

Contrast, in architecture, is to avoid the repetition of the ſame thing, in order to pleaſe by variety.

CONTRATE-Wheel, in watch-work, that next to the crown, the teeth and hoop whereof lie contrary to thoſe of the other wheels, from whence it takes its name. See the article Watch.

CONTRAVALLATION, or *the Line of* Contravallation, in fortification, a trench guarded with a parapet, and uſually cut round about a place by the beſiegers, to ſecure themſelves on that ſide, and to ſtop the ſallies of the garriſon.

It is without muſket-ſhot of the town, ſo that the army forming a ſiege, lies between the lines of circumvallation and contravallation.

CONTRAYERVA, the root of a plant growing in Peru and other parts of the Spaniſh Weſt-Indies. The root is an inch or two in length, and about half an inch thick; full of knots and irregular tubercles; ſurrounded on all ſides with numerous long tough fibres, moſt of which are loaded with ſcaly knobs; of a reddiſh brown colour on the outſide, and pale within. It was firſt brought into Europe, about the year 1581, by Sir Francis Drake.

This root, freed from the fibres, which are much weaker than the tuberous part, has a light aromatic ſmell; and a roughiſh, bitteriſh, penetrating taſte, which, as Teller obſerves, is not eaſily concealed by a large admixture of other ſubſtances. It is given, as a diaphoretic and antiſeptic, in low and malignant fevers, and appears to be one of the mildeſt and ſafeſt of the ſubſtances of the pungent kind commonly made uſe of in theſe intentions; not being liable to produce, though taken pretty freely, any conſiderable heat. The doſe, in ſubſtance, is from five or ſix grains to half a dram and more; in decoction or infuſion, from half a dram to two drams.

CONTRE, in heraldry, an appellation given to ſeveral bearings, on account of their cutting the ſhield contrary and oppoſite ways: thus we meet with contre-bend, contre-chevron, contre-pale, &c. when there are two ordinaries of the ſame nature oppoſite to each other, ſo as colour may be oppoſed to metal, and metal to colour.

CONTRIBUTION, in a general ſenſe, the payment of each perſon's quota, or the ſhare he bears in ſome impoſition or common expence. Contributions are either voluntary, as thoſe of expences for carrying on ſome undertaking for the public intereſt; or involuntary, as thoſe of taxes and impoſts.

Contribution, in a military ſenſe, an impoſition or tax paid by frontier-countries to an enemy, to prevent their being plundered and ruined by him.

CONTRITION, in theology, a ſorrow for our ſins, reſulting from the reflection of having offended God, from the ſole conſideration of his goodneſs, without any regard to the puniſhment due to the treſpaſs, and attended with a ſincere reſolution of reforming them.

The Scripture never uſes this term in this ſenſe; but there are ſeveral paſſages which prove, that without contrition there is no repentance, and without repentance no remiſſion of ſins.

CONTROL, Comptrol, or Controle, is properly a double regiſter kept of acts, iſſues of the officers or commiſſioners in the revenues, army, &c. in order to perceive the true ſtate thereof, and to certify the truth, and the due keeping of the acts ſubject to the enregiſterment.

CONTROLLER, an officer apppointed to control or overſee the accounts of other officers, and, on occaſions, to certify whether or no things have been controlled or examined.

Controller *of the Navy*. See the article Navy.

CONTROVER, in law, a perſon who, of his own head, invents and ſpreads falſe news.

CONTUMACY, in law, a refuſal to appear in court, when legally ſummoned; or the diſobedience to the rules and orders of a court having power to puniſh ſuch offence.

CONTUSION, in medicine, a bruiſe, or a ſolution of continuity, produced in any part of the body by any inſtrument whoſe ſurface does not riſe by way of edge, but in any obtuſe figure; by this means a contuſion is diſtinguiſhed from a wound, which is a ſolution of continuity produced by a ſharp cutting inſtrument.

Hence a contuſion, if all other circumſtances are alike, poſſeſſes a larger ſpace than a wound, becauſe, in the former, a large portion of the ſurface of the wounding inſtrument is applied to the body. Now it is ſufficiently obvious that, ſince action is equal to reaction, the effect will be the ſame, whether the obtuſe ſubſtance, by its gravity, acts upon any part of the body; or whether that of the body, by any kind of pinching, is contuſed.

We muſt therefore conſider a contuſion as an accumulation of minute wounds, with an attrition of the ſolids and capillary veſſels.

In the cure of a contuſion, we muſt attempt a reſolution, and if poſſible, prevent a ſuppuration, but much more a gangrene. Reſolution is principally performed, firſt, by rendering the extravaſated humours fluid; ſecondly, by relaxing the adjacent veſſels; and, thirdly, by procuring the reſorption of the extravaſated humours into the veſſels, by evacuating theſe veſſels, or by friction.

Bleed therefore plentifully; ſoon after exhibit a ſtrong, but not inflammatory purge; let a penetrating and reſolvent fomentation be applied to the part, and let warm frictions be uſed: mean time internal reſolvents, ſudorifics, and diuretics, are of conſiderable ſervice.

CONVALLIUM Lilium, lily of the valley, in botany, a genus of plants, with two or three oblong, acuminated, ribbed leaves; in the boſoms of which ariſes a naked ſtalk, bearing a number of ſmall, naked, white, drooping, bell-ſhaped, monopetalous flowers, cut about the edges into ſix ſegments, and followed by red berries: the roots are long, ſlender, and white. It is perennial, grows wild in woods and ſhady places, and flowers in May.

The flowers of this plant have a fragrant delightful ſmell, and a penetrating bitteriſh taſte; both which they readily impart to watery and to ſpirituous menſtrua.

It is principally from the volatile parts of theſe flowers that medicinal virtues have been expected in nervous and catarrhous diſorders; but probably their fixed parts alſo have no ſmall, perhaps the greateſt, ſhare in their efficacy. The flowers, dried and powdered, and thus diveſted of their odoriferous principle, prove ſtrongly ſternutatory. Watery or ſpirituous extracts made from them, given in doſes of a ſcruple or half a dram, act as gentle ſtimulating aperients and laxatives; and ſeem to partake of the purgative virtue, as well as of the bitterneſs, of aloes.

CONVENTICLE, a private aſſembly or meeting for the exerciſe of religion.

CONVENTION, a treaty, contract, or agreement between two or more parties. Every convention among men, provided it be not contrary to honeſty and good manners, produces a natural obligation, and makes the performance a point of conſcience.

Convention is alſo a name given to an extraordinary aſſembly of parliament, or the ſtates of the realm, held without the king's writ.

CONVENTUAL, in general, denotes ſomething belonging to a convent or monaſtery.

CONVERGING, or Convergent Lines, in geometry, are ſuch as continually approach nearer one another; or whoſe diſtance becomes ſtill leſs and leſs. Theſe are oppoſed to divergent lines, the diſtance of which become continually greater: thoſe lines which converge one way, diverge the other.

Converging Hyperbola is one whoſe concave legs bend in towards one another, and run both the ſame way. See Hyperbola and Curve.

Converging Rays, in optics, thoſe rays that, iſſuing from divers points of an object, incline towards another, till at laſt they meet and croſs, and then become diverging rays.

CONVERSE, in mathematics. One propoſition is called the converſe of another, when, after a concluſion is drawn from ſomething ſuppoſed in the converſe propoſition, that concluſion is ſuppoſed; and then, that which in the other was ſuppoſed, is now drawn as a concluſion from it: thus, when two ſides of a triangle are equal, the angles under theſe ſides are equal; and on the converſe, if theſe angles are equal, the two ſides are equal. See Triangle.

CONVERSION, in a moral ſenſe, implies a repentance of temper and conduct unworthy our nature, and unbecoming our obligations to its author, and a reſolution to act a wiſer and a better part for the future.

Conversion, in rhetoric, &c. is underſtood of arguments which are returned, retorted, and ſhewn on oppoſite ſides, by changing the ſubject into the attribute, and the attribute into the ſubject. See Attribute, &c.

Conversion, in war, a military motion whereby the front of a battalion is turned where the flank was, in caſe the battalion is attacked in the flank. See the article Quarter-wheeling.

Conversion *of Equations*, in algebra, is when the quantity ſought, or any part or degree thereof, being in fractions, the whole is reduced to one common denomination, and then omitting the denominators, the equation is continued in the numerators only. See Equation.

Conversion *of Propoſitions*, in logic, the changing of the ſubject into the place of the prædicate, and the prædicate into the place of the ſubject; and yet always retaining the ſame quality of both propoſitions: as, "Every right lined triangle has the ſum of its angles equal to two right ones: every right-lined figure, that has the ſum of its angles equal to two right ones, is a triangle."

CONVERT, a perſon who has undergone converſion. See Converſion.

Convert is more frequently uſed in reſpect of changes from one religion, or religious ſect, to another.

CONVEX, an appellation given to the exterior ſurface of gibbous or globular bodies, in oppoſition to the hollow inner ſurface of ſuch bodies, which is called concave: thus we ſay, a convex frieze, lens, mirror, ſuperficies, &c. See the articles Frieze, Lens, &c.

CONVEXITY, that configuration or ſhape of a body, on account of which it is denominated convex. See Convex.

CONVEYANCE, in law, a deed or inſtrument that paſſes land, &c. from one perſon to another.

The moſt uſual conveyances are deeds of gift, bargain and ſale, leaſe and releaſe, fines and recoveries, &c. The words *give and grant*, are neceſſary in a conveyance at common law: but though ſome maintain that conveyances ſhall operate according to the words; yet, of late, the judges have a greater regard to the paſſing of the eſtate, than to the manner by which it is paſſed.

CONVICT, in common law, a perſon that is found guilty of an offence by the verdict of a jury.

The law implies that there muſt be a conviction before puniſhment for any offence, though it be not mentioned in any ſtatute. On a joint indictment, or information, ſome of the defendants may be convicted and others acquitted.

Convict Recuſant, a perſon who has been legally preſented, indicted, and convicted for refuſing to come to church to hear the common prayer, according to the ſtatutes 1 and 23 Eliz. and 3 Jac. I.

CONVICTION, in theology, expreſſes the firſt degree of repentance, wherein the ſinner becomes ſenſible of his guilt, of the evil nature of ſin, and of the danger of his own ways. See Contrition.

CONVOCATION, an aſſembly of the clergy of England, by their repreſentatives, to conſult of eccleſiaſtical matters. It is held during the ſeſſion of parliament, and conſiſts of an upper and a lower houſe. In the upper ſit the biſhops, and in the lower the inferior clergy, who are repreſented by their proctors, conſiſting of all the deans and archdeacons, of one proctor for every chapter, and two for the clergy of every dioceſe, in all one hundred and forty-three divines, viz. twenty-two deans, fifty-three archdeacons, twenty-four prebendaries, and forty-four proctors of the dioceſan clergy. The lower houſe chooſes its prolocutor, whoſe buſineſs it is to take care that the members attend, to collect their debates and votes, and to carry their reſolutions to the upper houſe. The convocation is ſummoned by the king's writ, directed to the archbiſhop of each province, requiring him to ſummon all biſhops, deans, archdeacons, &c.

CONVOLVULUS, bindweed, in botany, a genus of plants, the corolla of which conſiſts of a ſingle, patent, campanulated petal, plicated and very lightly divided at the rim: the fruit is a capſule, of a roundiſh figure, contained within the cup, and formed of one, two, or three valves: the ſeeds are two, roundiſh, and often acute: the corolla is uſually cut in ten places, but there are ſpecies in which theſe crenæ are but five.

CONVOY, in military matters, a body of men that guard any ſupply of men, money, ammunition, or proviſions, conveyed by land into a town, army, or the like, in time of war.

Convoy, in naval affairs, any fleet or navy of merchant-ſhips bound on a voyage to ſome particular port or rendezvous; or more particularly the ſhip or ſhips appointed to conduct and defend them on their paſſage thither.

CONVULSION, *Spaſmus*, in medicine, a preternatural and violent contraction of the membranous and muſcular parts, ariſing from a ſpaſmodic ſtricture of the membranes ſurrounding the ſpinal marrow, and the nerves diſtributed from it, and an impetuous influx of the nervous fluid into the organs of motion.

Convulſions attack the patient variouſly; for in ſome they happen ſuddenly, without any ſigns of the approaching diſorder; whilſt in others, they may be foreſeen by various ſigns. During the convulſive paroxyſm, the limbs are ſurpriſingly agitated; ſometimes the arms are ſo retorted towards the back, that the patient ſeems to ſit upon them; ſometimes they beat the air: at other times, the legs are drawn into various directions; ſometimes they ſtamp; ſometimes the ſpine of the back is incurvated ſo as to form an arch, whilſt the breaſt is raiſed; and at other times the whole body is as ſtiff as a ſtone. Theſe agitations ſeize many in the very poſture in which they are, without throwing them on the ground; whilſt others, like epileptic patients, fall ſuddenly down, weep, laugh, grind their teeth, gape, hang out their tongue, and are vertiginous.

After the paroxyſm many patients retain an incredible languor of the whole body, many fall into deliriums, and a profound ſleep; in others, the diſorder is terminated by eructations, an exploſion of flatulencies, vomiting, a copious diſcharge of the lymph, &c. Thoſe are moſt ſubject to convulſions, whoſe nervous ſyſtems are either naturally, or by any other cauſe, weak, eſpecially if their juices be impure. Among the mediate cauſes which diſpoſe to this conſtriction of the ſpinal marrow, the moſt conſiderable are violent paſſions, eſpecially if the patient be expoſed to cold, or commits any error in regimen.

Though convulſions are very terrible, they are not ſuddenly mortal: when they are recent, the patient young, and the conſtitution ſound, an eaſy and ſhort cure is to be hoped for.

In the cure of convulſive motions, we are firſt to correct the material cauſes which ſupport the diſorder; prepare them for an elimination, and commodiouſly evacuate them: then the violent and irregular commotions of the nervous parts muſt be allayed, and the nervous ſyſtem corroborated, to prevent a relapſe: the cure is not to be obtained by a great variety of draſtic remedies; but rather by mild medicines, and ſuch as are friendly to nature. If the diſorder ariſes from a redundancy of humours, or a thickneſs of the blood, Hippocrates adviſes venæſection, either in the foot or arm, to be uſed; or ſcarifications to be interpoſed: but theſe motions are rarely removed without a proper air, exerciſe, and regimen. Warm baths for the feet, prepared of river-water and chamomile flowers, has a ſingular efficacy; and alſo large draughts of cold ſimple water. If convulſions ariſe from exceſs of venery, the patient is by all means to abſtain from any thing that produces commotions. If they ariſe from a ſuppreſſion of the menſes, &c. they muſt be removed by recalling theſe evacuations.

CONVULSIVE, in medicine, a term applied to thoſe motions which naturally ſhould depend on the will, but are produced involuntarily by ſome external cauſe, as a contraction of the muſcles, &c. See the preceding article.

CONYZA, flea-bane, in botany, a genus of plants, the compound flower of which is tubuloſe, conſiſting both of hermaphrodite and female ones: theſe laſt have no flower petals; but the hermaphrodite ones conſiſt of one infundibuliform petal, divided into five patulous ſegments at the limb: the ſtamina are five very ſhort capillary filaments: the ſeeds are ſolitary, oblong, and crowned with ſimple downy filaments, and ſtand in the cup.

The common flea-bane is recommended in the jaundice, to promote the menſes, and in the ſtrangury. Some alſo make an ointment of its leaves and root, which is ſaid to cure the itch.

COOLER, among brewers, diſtillers, &c. a large veſſel wherein certain liquors are cooled, after having been boiled.

Coolers, in medicine, thoſe remedies which affect the organs of feeling with an immediate ſenſe of cold, being ſuch as have their parts in leſs motion than thoſe of the organs of feeling; as fruits, and all acid liquors: or they are ſuch as, by a particular viſcidity, or groſſneſs of parts, give the animal fluids a greater conſiſtency than they had before, and conſequently retard their motion; having leſs of that inteſtine force on which their heat depends.

Of this ſort are cucumbers, and all ſubſtances producing viſcidity.

COOM, a term applied to the ſoot that gathers over an oven's mouth; alſo for that black, greaſy ſubſtance, which works out of the wheels of carriages.

COOMB, or Comb *of Corn*, a dry meaſure containing four buſhels, or half a quarter. See the article Measure.

CO-ORDINATE, ſomething of equal order, rank, or degree with another.

COPAL, in natural hiſtory, a particular ſort of reſin brought in irregular lumps from New Spain, where it is ſaid to be obtained from different ſorts of large trees, of which eight are deſcribed by Hernandez. Some pieces are whitiſh, ſemi-tranſparent, friable, not unlike the finer kinds of common reſin groſsly powdered and forced together into a maſs. Others are more tranſparent and leſs friable, and of a yellowiſh or brown colour. It has a more agreeable ſmell than frankincenſe, to which ſome have reſembled it, and does not melt ſo thin or burn away ſo faſt upon a red-hot iron. It does not ſoften in the mouth, on being chewed, like anime, with which it has been confounded by others. From theſe and other reſinous bodies it differs more remarkably in its being exceeding difficultly diſſoluble in rectified ſpirit of wine.

Solutions of copal have been greatly eſteemed as varniſhes, and the method of making the ſolution kept a ſecret in particular hands. Juncker informs us, that it readily ſucceeds, if ſpirit of ſal ammoniac, mixed with a due proportion of oil of ſpike or oil of turpentine, is uſed for the menſtruum.

COPARCENERS, otherwiſe called *Parceners*, ſuch as have equal portions in the inheritance of their anceſtor.

COPE, among eccleſiaſtical writers, an ornament formerly worn by chantors and ſubchantors, when they officiated in the church ſolemnity. It is alſo worn by Romiſh biſhops, and other ordinaries; and reaches from the ſhoulders to the feet.

Cope, among miners, a duty of ſix-pence for every load of ore.

COPENHAGEN, the capital of the kingdom of Denmark, ſituated on the eaſtern-ſhore of the iſland of Zealand, upon a fine bay of the Baltic ſea, not far from the Streight called the Sound, in the 55°. 30′. north lat. and in 13°. eaſt long.

It is a ſtrong town, about five miles in circumference, ſortified after the modern way; and the harbour is ſurrounded by forts and platforms, its entrance being ſo narrow, that only one ſhip can paſs in at a time. It has an univerſity and military academy, and is remarkable for one of the fineſt muſeums, or collection of curioſities, in Europe.

COPERNICAN-SYSTEM, or Hypothesis, that ſyſtem of the world wherein the ſun is ſuppoſed at reſt in the center, and the planets, with the earth, to move in ellipſes round him.

The ſun and ſtars are here ſuppoſed at reſt, and that diurnal motion which they appear to have from eaſt to weſt, is imputed to the earth's motion from weſt to eaſt, round its axis. See the articles Earth and Planets.

This ſyſtem was received of old by Philolaus, Ariſtarchus, and Pythagoras, from which laſt it had the name of the Pythagoric ſyſtem: it was alſo held by Archimedes; but after him it became neglected, and even forgotten for many ages, till it was revived by Copernicus, about the year 1500, and from him named the Copernican ſyſtem.

According to this hypotheſis, the ſun is ſuppoſed very near the center of gravity of the whole ſyſtem, and in the common focus of every one of the planetary orbits: next him Mercury performs his revolution around him; next Mercury is the orbit of Venus; and next to Venus, our earth, with its attendant or ſecondary, the moon, performing a joint courſe, and in their revolution meaſuring out the annual period. Next the earth is Mars, the firſt of the ſuperior planets; next him Jupiter, and laſt of all Saturn. See plate XLIV. *fig.* 11.

Theſe and the comets are the conſtituent parts of the ſolar ſyſtem, which is now received and approved as the only true one, for the reaſons following. See the articles Comet, Venus, Mars, &c.

1. It is moſt ſimple, and agreeable to the tenor of nature in all her actions; for by the two motions of the earth, all the phænomena of the heavens are reſolved, which, by other hypotheſes, are inexplicable, without a great number of other motions contrary to philoſophical reaſonings. See the articles Ptolemaic and Tychonic System.

2. It is more rational to ſuppoſe that the earth moves round the ſun, than that the huge bodies of the planets, the ſtupendous body of the ſun, and the immenſe firmament of ſtars, ſhould all move round the inconſiderable body of the earth, every twenty-four hours.

3. But that harmony which upon this ſuppoſition runs through the whole ſolar ſyſtem, wonderfully confirms this hypotheſis, viz. that the motions of all the planets, both primary and ſecondary, are governed and regulated by one and the ſame law, which is, that the ſquares of the periodical times of the primary planets, are to each other as the cubes of their diſtances from the ſun; and likewiſe the ſquares of the periodical times of the ſecondaries of any primary, are to each other as the cubes of their diſtances from that primary. Now the moon, which, in the Copernican ſyſtem, is a ſecondary of the earth, in the other hypotheſis is a primary one: and ſo the rule cannot take place, becauſe the periodical time, conſidered as that of a primary one, does not agree therewith. See the article Moon, Period, &c.

4. Again, this ſingle conſideration Mr. Whiſton thinks enough to eſtabliſh the motion of the earth for ever, viz. If the earth does not move round the ſun, the ſun muſt move with the moon round the earth. Now the diſtance of the ſun, to that of the moon, being as 10,000 to 46, and the moon's period being leſs than 28 days, the ſun's period would be found no leſs than 242 years; whereas, in fact, it is but one year.

5. The ſun is the fountain of light and heat, which it irradiates through all the ſyſtem, and therefore it ought to be placed in the center, ſo that the planets may at all times have it in an uniform and equable manner.

6. For if the earth be in the center, and the ſun and planets revolve about it, the planets would then, like the comets, be ſcorched with heat, when neareſt the ſun, and frozen with cold in their aphelia, or greateſt diſtance, which is not to be ſuppoſed.

7. If the ſun be placed in the center of the ſyſtem, we then have the rational hypotheſis of the planets being all moved about the ſun, by the univerſal law or power of gravity ariſing from his vaſt body, and every thing will anſwer to the laws of circular motion and central forces; but otherwiſe we are wholly in the dark, and know nothing of the laws and operations of nature.

8. But happily we are able to give not only reaſons, but demonſtrative proofs, that the ſun does poſſeſs the center of the ſyſtem, and that the planets move about it at the diſtance and in the order aſſigned in this and in other places. See the article Distance.

The firſt is, that Mercury and Venus are ever obſerved to have two conjunctions with the ſun, but no oppoſition, which could not happen unleſs the orbits of theſe planets lay within the orbit of the earth.

9. The ſecond is, that Mars, Jupiter, and Saturn, have each their conjunctions and oppoſitions to the ſun alternately and ſucceſſively, which could not be, unleſs their orbits were exterior to the orbit of the earth.

10. In the third place, the greateſt elongation or diſtance of Mercury from the ſun, is about 20°, and that of Venus 47°; which anſwers exactly to their diſtance in this ſyſtem, though in the Ptolemean ſyſtem they might,

and would, ſometimes be ſeen 180°. from the ſun, *viz.* in oppoſition to him.

11. Fourthly, in this diſpoſition of the planets they will all of them be ſometimes much nearer to the earth than at others; the conſequence of which is, that their brightneſs and ſplendor, and alſo their apparent diameters, will be proportionally greater at one time than another; and this we obſerve to be true every day. Thus the apparent diameter of Venus, when greateſt, is near 66″, but when leaſt, not more than 9″ and a half; of Mars, when greateſt, it is 21″, but when leaſt, no more than 2″ and a half; whereas, by the Ptolemean hypotheſis, they ought always to be equal.

12. The fifth is, that when the planets are viewed with a good teleſcope, they appear with different phaſes, or with different parts of their bodies enlightened. Thus Venus is ſometimes new, then horned, and afterwards dichotomized, then gibbous, afterwards full, and ſo increaſes and decreaſes her light in the ſame manner as the moon, and as the Copernican ſyſtem requires.

13. The ſixth is, that the planets, all of them, do ſometimes appear direct in motion, ſometimes retrograde, and at other times ſtationary. Thus Venus, as ſhe paſſes from her greateſt elongation weſtward, to her greateſt elongation eaſtward, will appear direct in motion, but retrograde as ſhe paſſes from the latter to the former; and when ſhe is in thoſe points of greateſt diſtance from the ſun, ſhe ſeems for ſome time ſtationary: all which is neceſſary upon the Copernican hypotheſis, but cannot happen in any other.

14. The ſeventh is, that the bodies of Mercury and Venus, in their lower conjunctions with the ſun, are hid behind the ſun's body, and in the upper conjunctions are ſeen to paſs over the ſun's body, or diſk, in form of a black round ſpot, which is neceſſary in the Copernican ſyſtem, but impoſſible in the Ptolemean ſyſtem.

15. The eighth, and laſt, is, that the times in which theſe conjunctions, oppoſitions, ſtations, and retrogradations of the planets happen, are not ſuch as they would be were the earth at reſt in its orbit, but preciſely ſuch as would happen were the earth to move, and all the planets in the periods aſſigned them; and therefore this, and no other, can be the true ſyſtem of the world.

COPERNICUS, the name of an aſtronomical inſtrument, invented by Mr. Whiſton, to exhibit the motion and phænomena of the planets, both primary and ſecondary. It is built upon the Copernican ſyſtem, and for that reaſon called by this name. It conſiſts of ſeveral concentrical circles of wood, upon which are inſcribed numbers, transferred hither from the aſtronomical tables; by the various diſpoſition of theſe circles, which are made ſo as to ſlide within each other, queſtions are ſolved ſo as to ſave long calculations. To exhibit eclipſes there is a particular apparatus, conſiſting of a terreſtrial globe, ſo diſpoſed, as that, being turned round its axis, the light of the ſun, or a candle projected through a glaſs plane, marked out into concentric circles, expreſſes the digits of the eclipſe: and thus is tho path of the eclipſe, with its degree or quantity in any part of the path, repreſented with great accuracy.

The inventor of this inſtrument has wrote a treatiſe purpoſely to explain it.

COPHTS, Cophti, or Copts, a name given to ſuch of the Chriſtians of Egypt as are of the ſect of Jacobites.

The Cophts have a patriarch, who is ſtiled the patriarch of Alexandria, having eleven or twelve biſhops under him, but no archbiſhop. The reſt of the clergy, whether ſecular or regular, are of the order of St. Anthony, St. Paul, and St. Macarius, each of whom have their monaſteries.

COPHTIC, or Coptic Language, is that ſpoke by the Cophts, being the ancient language of the Egyptians, intermixed with the Greek, and the characters of it being thoſe of the Greek.

Coptic Monks, religious, among the Chriſtians of Egypt, who have the higheſt veneration for a monaſtic life, conſidering it as the philoſophy of the law of Jeſus Chriſt, the monks as terreſtrial angels, or celeſtial men. They are obliged to part with their poſſeſſions, to renounce marriage for ever, to live in deſarts, to be cloathed in wool, and to eat no meat.

COPIATA, a man of a particular order in the primitive church, whoſe buſineſs it was to bury the dead, by preparing the graves, wrapping up the dead bodies, &c. being accounted a work of piety; wherefore the copiatæ were conſidered as having a relation to the clergy.

COPING, or Copping *of a Wall*, in architecture, the top or covert of a wall, made ſloping, to carry off the wet.

Coping *over*, in carpentry, a ſort of hanging over, not ſquare to its upright, but bevelling on its under ſide, till it ends in an edge.

COPIVI, or *Balſam of* Copivi. See the article Balsam.

COPPEL, Copel, or Cuppel, a chemical veſſel made of earth, pretty thick, and of the form of a platter or diſh.

It ſuſtains the higheſt degree of fire, and retains all fuſed metals: but in it all the foſſile portions of any metal, when mixed with fuſed lead, are carried off, except gold and ſilver, which are left behind in ſmall globules. See Assaying.

This veſſel has a ſmall cavity, which is a kind of obtuſe, ſpherical ſegment, with a canal at its margin, through which the metal examined may be the more commodiouſly poured out. The external ſurface of the coppel is ſomewhat like a truncated cone, that it may ſtand the more ſecurely. It may be made of different bulks, according to the quantity of metal to be tried, and may be made either of ſome proper earth, or of aſhes obtained from the calcined bones almoſt of any animals, except thoſe of hogs; for the coppels made of theſe, beſides lead and other foſſils, alſo abſorb ſome parts of gold and ſilver. The aſhes of calcined plants are alſo proper for this purpoſe, provided their ſalts are well waſhed out of them. Plaiſter alſo of ſome kinds Cramer thinks preferable to any other materials for this purpoſe: the ſmaller bones of calves, oxen, ſheep, and horſes, are moſt commonly uſed, and theſe are the more eaſily calcined the longer they have been expoſed to the injury of the weather. A ſmall quantity of the aſhes of theſe bones, after being calcined to the higheſt degree of whiteneſs, is to be triturated in a mortar, then put into an earthen veſſel, and a ſecond time calcined in a ſtrong fire, for ſome hours: afterwards the aſhes muſt be waſhed with water, and levigated to a fine powder, which, when moiſtened by water and the white of an egg, till the maſs coheres, is to be excavated with a peſtil; then a ſolution of the powder of vitriol may be ſprinkled over the ſurface, and the coppel laid by in a dry place, after the inequalities, protuberating on the upper margins and the bottoms, are cut off with a ſharp knife.

COPPELLING, or Cupelling, in chemiſtry, is the putting metallic ſubſtances into a coppel, or covered veſſel, made of bone-aſhes, and ſet in a naked fire, to try what gold or ſilver they will afford.

COPPER, *Venus*, in natural hiſtory, a reddiſh metal, eaſily tarniſhing in a moiſt air, and contracting a green or a bluiſh green ruſt. It is the moſt elaſtic and ſonorous of all the metals, and the hardeſt of all but iron. It ſpreads difficultly under the hammer, but may be extended to a great degree, drawn into fine wire, and beat into thin leaves. Its ſpecific gravity is near nine times greater than that of water.

It requires for its fuſion a ſtrong white heat, greater than that in which gold and ſilver melt, though not ſo great as that which is requiſite for the fuſion of iron. When melted, it is remarkably impatient of moiſture: the contact of a little water occaſions the melted copper to be thrown about with violence, to the great danger of the by-ſtanders. It may neverthleſs be granulated, like other metals, by cautiouſly pouring a very little at a time into water.

Kept in a heat below fuſion, it contracts on the ſurface thin powdery ſcales, which, if rubbed off, are ſucceeded by freſh ones, till the whole quantity of the metal is thus ſlowly changed into a dark reddiſh ſcoria or calx. This does not melt in the greateſt degree of fire that our furnaces are capable of giving; but in the concentrated ſolar heat, it runs eaſily into a deep red and almoſt opake glaſs. A flaming fire, and a ſtrong draught of air over the ſurface of the metal, promote its calcination: the flame being tinged of a green, bluiſh, or rainbow colours, is a mark that the copper burns.

Copper diſſolves in every acid, in alcalies, both fixed and volatile, in neutral ſaline liquors, and in oils; and when diſſolved exhibits fine blue, green, or bluiſh-green colours, by which this metal is readily diſtinguiſhed, however mixed or diſguiſed with other ſubſtances. Even pure water, ſuffered to ſtand long in copper-veſſels, extracts ſo much as to gain a coppery taſte: it is obſervable that water becomes more impregnated with the taſte on ſtanding in the cold, than if boiled in the veſſel for a longer time.

The nitrous acid diſſolves copper the moſt readily and plentifully: the ſolution is of a green colour.

The marine acid acts more languidly: the ſolution made in this acid yields on being inſpiſſated, a greeniſh maſs, which readily diſſolves in water, deliquiates in the air, gives a green tincture to rectified ſpirit of wine, melts in a ſmall heat, takes fire from a candle, and burns with a blue flame. The marine acid forſakes mercury to unite with copper: on expoſing to the fire a mixture of copper and mercury-ſublimate, the acid of the ſublimate forms with copper a fuſible inflammable concrete, ſimilar to the foregoing, whilſt the mercury, diſengaged, diſtils in its running form.

The vitriolic acid does not eaſily diſſolve copper, unleſs highly concentrated and aſſiſted by a conſiderable heat: the ſolution is of a blue colour, and on evaporating a part of the humidity, ſhoots into elegant blue cryſtals of a rhomboidal figure; theſe are the blue vitriol of the ſhops. The ſolution is moſt commodiouſly obtained by drawing over the oil of vitriol from the copper, and elixating the reſiduum with water; then returning the diſtilled ſpirit upon the undiſſolved copper, and repeating the abſtraction: or by ſtratifying the copper with ſulphur, in a crucible, and calcining or cementing them together; the copper will abſorb the acid of the ſulphur, ſo as to become in part ſoluble in water, and yield the ſame cryſtals as if the metal had been boiled directly in the vitriolic acid.

Volatile alcalies, added to the ſolutions made in acids, occaſion at firſt ſome precipitation, but preſently rediſſolve what they had thrown down, and change the colour, from a green or a pale blue, to a deep and lovely blue: if the liquor is expoſed for a time to the air, the volatile alcali eſcapes, and the colour which proceeded from it diſappears. Volatile alcalies extract a blue tincture alſo from filings of the metal, without the intervention of any acid.

Copper is exceeding rarely found pure in the earth. Of its ores there is a great variety, intermixed with different ſtony matters, generally abounding with ſulphur, ſometimes containing a little arſenic. Theſe ores are often of beautiful colours, blue, red, green, yellow, variegated like the rainbow or peacock's tail, moſt commonly green or blue: they are of all ores the moſt beautiful. The lapis lazuli, from which the precious blue pigment called ultramarine is prepared, is one of the ores of this metal. Some of them contain no metal but copper; many have an admixture of others; and there are few ores of other metals without ſome portion of copper in them. Copper is of all metals the moſt difficultly obtained pure from the ore; ſulphur adhering to it ſo ſtrongly, as not to be expelled without long calcination. When copper and iron are blended together in the ore, the copper cannot by any method as yet known, be ſeparated to advantage: a rich copper mine, at Lauterberg in the Hartz foreſt, lies on this account unworked.

There are ores of copper in almoſt all parts of the world; in Spain, France, England, Norway, Saxony, Bohemia; but more particularly in Sweden, Hungary, and Tranſylvania. Japan affords a ſort of copper ſuperior to any met with in Europe.

Copper is found alſo in a vitriolic ſtate, diſſolved in certain waters, as at Neuſol in Hungary: when iron is put into the water, the diſſolved copper ſeparates; a proportionable quantity of the iron being diſſolved in its place. The copper, extricated from the liquor, adheres to the iron, and covers its ſurface with a bright cupreous cruſt: ſome have been ſo far impoſed on, as to imagine the iron, by this means, actually tranſmuted into copper.

Copper-Plates *for engraving.* Plates intended for engraving ought to be formed of the beſt copper; which can be diſtinguiſhed only by examining it with regard to the qualities requiſite to the conſtituting it good. Thoſe qualities are, that it ſhould be very malleable, that is, capable of being ſpread with the hammer, or ſuffering itſelf to be rolled or drawn out to the niceſt or ſmalleſt pieces; that it ſhould nevertheleſs be firm, and reſiſt even to ſome degree of hardneſs, provided no ſhortneſs of grain or brittleneſs attend, but that it be perfectly ductile; and that it be free from any veins, ſpecks, or diſſimilar parts, but of an equal texture through the whole. The redneſs of copper is a preſumptive mark of its being good, but not an infallible one: for though it is in general a proof of the purity of the copper, yet it does not evince that the qualities may not be injured by too frequent fuſions, or the calcinations it may have undergone, if, as is frequently the caſe, it has before been employed in forming ſome utenſil.

The copper being choſen, it muſt be fabricated into plates of the ſize demanded, the thickneſs of which may be in proportion of a line to plates that are a foot by nine inches. Theſe plates muſt then be well forged and planiſhed by a brazier; which ſhould be done cold: for by managing this operation well, the poroſity of the copper may be greatly removed, which is for the moſt obvious reaſons of great conſequence. When a plate is forged it ſhould be examined which ſide is the moſt even, and the leaſt flawed or cracked; and then the poliſhing may be thus performed.

Put the plate upon a board leaning obliquely, and in the bottom of which two nails or points are fixed, to keep it from ſliding off; and then take a large piece of grind-ſtone dipt in water, and rub it very ſtrongly once in every part length-ways, and then the ſame breadth-ways, keeping it moiſt with water; and repeat this operation till no hollows appear, nor the leaſt mark made by the hammer in forging, or any other flaws, holes, or inequalities. After this take a piece of good pumice-ſtone, and rub the plate with it in the ſame manner as was done before with the grind-ſtone, till all the ſcratches and marks made of the grind-ſtone may, by the pumice-ſtone, be likewiſe taken away, and then waſh it thoroughly clean. The ſcratches and marks of the pumice-ſtone ſhould then be taken out by rubbing the plate in the ſame manner with a piece of oil-ſtone, till all the marks and ſcorings of the pumice-ſtone be taken out: and the plate ſhould be then waſhed with water till it be perfectly clean. A proper kind of coal muſt in the mean time be prepared for finiſhing the preparation of the plate, which muſt be done in the following manner:

Take three or four large coals of ſallow wood, ſound and without clefts; and place them together in a fire made on a hearth, and cover them with other burning coals; heaping a quantity of red-hot aſhes upon them. In this manner let them remain, being ſubject to only a ſmall acceſs of air, for about an hour and a half: but the time ſhould be greater or leſs, according to their ſize, that the fire may penetrate into the innermoſt part of them, and expel all the ſmoke that can be driven out; to be certain of which, it is better they ſhould ſtay in the fire rather longer than is neceſſary, than that the time ſhould be unduly ſhortened. When they are fit to be taken out, a veſſel of water large enough to hold them ſhould be prepared; and they ſhould be inſtantly thrown into it, and left there to extinguiſh and cool. For this purpoſe ſome uſe urine inſtead of water; but there is no difference, unleſs in the diſagreeable ſmell of the latter. The coals being thus prepared, pick out one, or a part of one, ſufficiently large, firm, and free from clefts; and holding it faſt in the hand, ſet one of the corners againſt the plate, and rub it, but without obſerving any particular direction, to take out the marks

or

PLATE XLV.

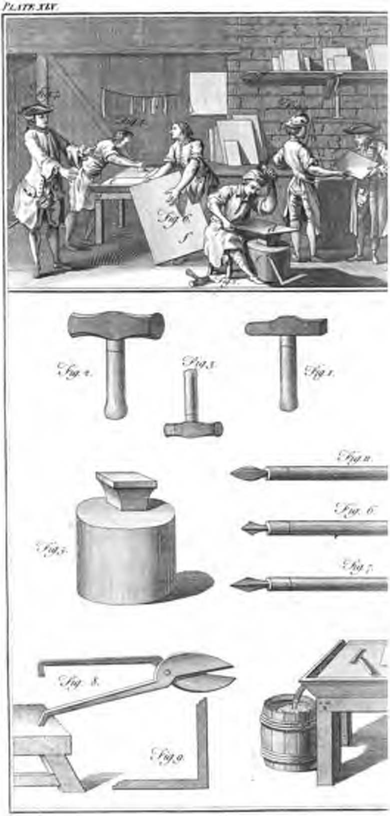


Fig. 6
Fig. 2
Fig. 3
Fig. 1
Fig. 11
Fig. 6
Fig. 5
Fig. 7
Fig. 8
Fig. 9

or ſcorings of the oil-ſtone: but if the coal glide on the ſurface, and take no effect, it is a proof of its not being fit for the purpoſe; and another, that is not ſo faulty, muſt be uſed inſtead of it. This fitneſs may be thus diſtinguiſhed; that the coal, if good, being wet, and rubbed on the copper, will ſeem rough, and grate it with a low murmuring noiſe. When a good coal is obtained, the operation muſt be continued, till not the leaſt ſcoring, flaw, or hole whatever, appears; but if the coal itſelf, as will ſometimes happen, be too hard, and leaves traces or ſcores of its own forming, a ſofter one muſt be choſen, and uſed in the ſame manner as the firſt, to remedy the defects of it, and to procure a perfectly clear and even ſurface on the plate.

This is the method directed by Le Boſſe: but the end may be better anſwered, by firſt wearing out the marks of the planiſhing hammer, by rubbing with emery finely ground; and then, the plate being waſhed clean, bruſhing it over with the refiner's aqua-fortis; which muſt be ſuffered to lie on till the ebullition it produces begins to decreaſe; and then waſhed off, by immerſing the plate in water; when it will be found to be brought to a better condition to take the burniſh with more certainty, than by the laborious uſe of ſo many ſtones and the coal.

The plate being brought to this ſtate, the poliſhing muſt be finiſhed with a ſteel burniſher, with which it muſt be ſtrongly rubbed; the beſt method of moving the burniſher is not to work it length-ways, or breadth-ways, but in a diagonal direction, or from corner to corner, which will more effectually take out all remains of the former ſcorings or lines. The copper muſt be thus burniſhed till it be as bright as a looking-glaſs in every part; but if, when the reſt is thus bright, ſome particular ſpots appear dull, or that any lines remain, ſuch faults ſhould be again worked with the burniſher, till the whole be uniformly ſhining.

When the plates are deſigned for etching, being thus finiſhed with the burniſher, they ſhould be well waſhed with clean water, and then dried by the fire; after which they ſhould be wiped dry with a linen cloth: and to be certain that there may be no kind of greaſe upon them, they ſhould be rubbed over with the crumb of very ſtale bread; or the ſcraping very ſoft chalk over it, and rubbing the plate well with it, is a very certain means of prevention of either any greaſe, bread, or other foulneſs whatever remaining. There is one very certain method of trying whether the plate be perfectly well poliſhed or not; which is, to rub it over with the printing ink, and proceed to take (or pull off, as it is called) a proof in the ſame manner as if it had been engraved; which if the plate make not the leaſt impreſſion on the paper, but leave it intirely white as before it paſſed through the preſs, it is certain the poliſhing is complete; or if, on the other hand, any lines appear to be printed, it is evident the plate is faulty, and muſt be poliſhed over again, either by the other means, or the burniſher, as the ſtrength of the lines may indicate occaſion. If, however, the plate be deſigned for etching, great care ought to be taken, after this method of trial, to cleanſe it thoroughly from the oil of the printing ink, or any other foulneſs.

Explanation of plate XLV.

The upper compartment of the plate repreſents a ſhop where the workmen are employed in making copper-plates for engravers.

Fig. 1. Is a workman employed in ſcraping the ſurface of a copper-plate, in order to take out the marks of the hammer, or any other inequalities. *a*, The copper-plate. *x*, *x*, the ſcraper. *b*, another copper-plate to be ſcraped. This operation is, indeed, generally performed here with a piece of grind-ſtone, as we have already obſerved.

Fig. 2. A workman planiſhing a copper-plate. *d*, the plate. *c*, the block or foot of the anvil.

Fig. 3. A workman rubbing the plate with a piece of pumice ſtone.

Fig. 4. Another workman rubbing the ſurface of the plate with an oil-ſtone. The plate is afterwards rubbed with a piece of charcoal, in order to free it entirely from all holes, flaws, or ſcratches, it may ſtill retain. *e*, is a kind of table, ſupported by four legs, and on which the above operations are performed.

Fig. 5. A workman who weighs the copper.

Fig. 6. Another workman ſhewing a copper-plate to an engraver *fig.* 7. *f*, the copper-plate.

Lower Compartment of the Plate.

Fig. 1, 2, 3. Hammers of different ſizes; the latter is uſed in planiſhing.

Fig. 4. An anvil covered with parchment to prevent its ſcratching the ſurface of the plate.

Fig. 5. A planiſhing anvil.

Fig. 6, 7. Two ſcrapers. They are made of pieces of well tempered ſteel, having an edge on each ſide, and faſtened in a wooden handle with a ferule.

Fig. 8. The ſheers for cutting off the rough ſides of the plate.

Fig. 9. A ſquare for forming the ſides perpendicular to each other.

Fig. 10. The poliſhing table.

Fig. 11. A burniſher.

COPPERAS, a name given to the factitious green vitriol. See the article VITRIOL.

COPPICE, or COPSE, a little wood, conſiſting of under-woods, or ſuch as may be raiſed either by ſowing or planting.

When they are intended to be raiſed from maſt or ſeed, the ground is ploughed in the ſame manner as it is for corn: and either in autumn or in ſpring, good ſtore of ſuch maſts, nuts, ſeeds, berries, &c. are to be ſown with the graſs, which crop is to be cut, and then the land laid for wood. They may alſo be planted about autumn, with young ſets, or plants, in rows about ten or fifteen feet diſtance. If the copſes happen to grow thin, the beſt way of thickening them is to lay ſome of the branches or layers of the trees, that lie neareſt to the bare places, on the ground, or a little in the ground: this detained with a hook or two, and covered with freſh mould at a competent depth, will produce a multitude of ſuckers, and thicken a copſe ſpeedily.

COPULA, in logic, the verb that connects any two terms in an affirmative or negative propoſition; as "Riches make a man happy;" where *make* is the copula: "No weakneſs is any virtue;" where *is* is the copula.

COPULATION, the act of generation, or the congreſs of the male and female, otherwiſe called coition.

COPULATIVE PROPOSITIONS, in logic, thoſe where the ſubject and predicate are ſo linked together, by copulative conjunctions, that they may be all ſeverally affirmed or denied one of another. Example, "Riches and honours are apt to elate the mind, and increaſe the number of our deſires."

COPULATIVE CONJUNCTION. See the article CONJUNCTION.

COPY, in a law ſenſe, ſignifies the tranſcript of any original writing, as the copy of a patent, charter, deed, &c.

COPY, among printers, denotes the manuſcript, or original of a book, given to be printed.

COPY-HOLD, a tenure for which a tenant has nothing to ſhew but the copy of the rolls made by the ſteward of the lord's court.

It is called a baſe tenure, becauſe the tenant holds the land at the will of the lord. However, it is not ſimply at the will of the lord, but according to the cuſtom of the manor by which ſuch eſtate is deſcendible, and the tenant's heirs may inherit it; and a copy-holder, ſo long as he does his ſervices, and does not break the cuſtom, cannot be ejected by the lord; and if he be, he ſhall have treſpaſs againſt him.

Some copyholds the tenants hold by the verge in ancient de meſne; and though held by copy, yet they are a kind of freehold: and other copyholds are ſuch as tenants hold by common tenure, called mere copyhold.

Copyhold inheritances have no collateral qualities, which do not concern the deſcent, as to make them aſſets to bind the heir, or whereof the wife may be endowed, &c. They are not extendible in execution, but are within the acts againſt bankrupts, and the ſtatutes of limitation.

COPY-HOLDER, one who is admitted tenant of lands or tenements within a manor, which, time out of mind, by uſe and cuſtom of the manor, have been demiſable and demiſed to ſuch as will take them in fee-ſimple or fee-tail, for life, years, or at will, according to the cuſtom of the manor by copy of court-roll; but is generally where the tenant has ſuch eſtate either in fee or for three lives.

COR, *the* Heart, in anatomy. See Heart.

Cor Caroli, in aſtronomy, an extra-conſtellated ſtar in the northern hemiſphere, ſituated between the coma Berenices, and urſa major, ſo called by Dr. Halley in honour of king Charles.

Cor Hydra, a fixed ſtar of the firſt magnitude, in the conſtellation of hydra.

Cor Leonis, or Regulus, in aſtronomy, a fixed ſtar of the firſt magnitude, in the conſtellation leo.

Cor Marinum, in natural hiſtory, a name given to the heart-faſhioned echini-marini.

Cor Veneris, the name of a beautiful kind of heart ſhells, called alſo cor bovis.

CORACOBRACHIALIS, in anatomy, a muſcle that has its origin at the coracoide proceſs of the ſcapula, and its termination about the middle part of the arm. It ſerves to lift the arm obliquely outwards.

CORACOHYOIDÆUS, in anatomy, a muſcle which having its origin from the upper edge of the ſcapula, near its neck, aſcends obliquely under the maſtoidæus, and is inſerted in the os hyoides, which it ſerves to pull obliquely downwards. See the article Hyoides.

CORACOIDES, in anatomy, a ſmall, ſharp proceſs of the ſcapula, ſo called from its reſembling a crow's bill.

The coracoide proceſs in infants, is but a cartilage, afterwards it becomes an epiphyſis; and, after this, about the age of ſixteen, it is perceived to be a ſeparate bone. It ſerves to ſtrengthen the articulation of the ſhoulder, and gives origin to one of the muſcles of the arm.

CORACOMANTES, in antiquity, perſons who foretold events from their obſervations on crows.

CORACO-RADIALIS, in anatomy, the ſame with biceps. See Biceps.

CORAL, Corallium, a hard, brittle, branched ſubſtance, reſembling the ſtalk of a plant, uſually about the thickneſs of a gooſe's quill; full of knots; ſometimes ſtraight, and ſometimes variouſly bent; both externally and internally of a deep bright red colour. It is found adhering to rocks and other bodies in the ſea, particularly in the Mediterranean; covered with a ſoft fungous bark, in which is a great number of cells curiouſly divided, containing a milky juice, with apertures on the ſurface: this cortical part is ſeparated while freſh and ſoft. It has been generally referred to the vegetable kingdom; but is more probably the work and the neſt of little animals.

Red coral appears to have for its baſis a kind of calcareous animal earth, and is changed by calcination into quicklime, diſſolves in all acids except the vitriolic, and is precipitated by this laſt from its ſolutions made in the others. It is uſed alſo, like thoſe productions, as an abſorbent of acid humours in the firſt paſſages; and like them, when ſaturated with ſuch acids as are generated in the bodies of animals, it forms therewith a reſtringent ſaline compound. That it has any virtues diſtinct from thoſe of the other calcareous abſorbents, or that it is ſuperior in abſorbent power to the cheaper teſtaceous bodies, there are no grounds to ſuſpect.

The levigated coral is ſometimes counterfeited in the ſhops with the common teſtacea coloured with dragon's blood or red bole. Theſe abuſes may be diſcovered, by ſhaking the powder with water, and ſuffering it to ſettle, when the white and the colouring matter will ſeparate from one another, and appear in great part diſtinct: dragon's blood may be known likewiſe by its giving a red tincture to ſpirit of wine, and bole by its retaining its redneſs in the fire, whilſt coral burns white.

Coral Fishery. Red coral is found in the Mediterranean, on the ſhores of Provence, from Cape de la Couronne to that of St. Tropez; about the iſles of Majorca and Minorca; on the ſouth of Sicily; on the coaſts of Africa; and, laſtly, in the Ethiopic ocean, about cape Negro. The divers ſay, that the little branches are found only in the caverns whoſe ſituation is parallel to the earth's ſurface, and open to the ſouth. The manner of fiſhing being nearly the ſame wherever coral is found, it will ſuffice to inſtance the method uſed at the baſtion of France, under the direction of the company eſtabliſhed at Marſeilles for that fiſhery. Seven or eight men go in a boat, commanded by the patron or proprietor, and when the net is thrown by the caſter, the reſt work the veſſel, and help to draw the net in. The net is compoſed of two beams of wood tied croſs-wiſe, with leads fixed to them: to theſe they faſten a quantity of hemp twiſted looſely round, and intermingled with ſome large netting. This inſtrument is let down where they think there is coral, and pulled up again when the coral is ſtrongly intangled in the hemp and netting. For this purpoſe, ſix boats are ſometimes required; and if in hauling in, the rope happens to break, the fiſhermen run the hazard of being loſt. Before the fiſhers go to ſea, they agree for the price of the coral, which is ſometimes more, ſometimes leſs a pound; and they engage, on pain of corporal puniſhment, that neither they nor their crew ſhall embezzle any, but deliver the whole to the proprietors. When the fiſhery is ended, which amounts one year with another to twenty-five quintals for each boat, it is divided into thirteen parts, of which the proprietor hath four, the caſter two, and the other ſix men one each; the thirteenth belongs to the company for payment of the boat furniſhed them.

Artificial Coral is made of cinnabar well beaten; a layer whereof is applied on a piece of wood well dried and poliſhed, being firſt moiſtened with ſize: the whole is then again poliſhed, and for varniſh rub it over with the white of an egg.

Coral-Tree, or Coral-Wood, in botany, the ſame with the corallodendron.

CORALLINE, Corallina, in botany, is a genus of ſubmarine plants, conſiſting of ſtalks and branches often beautifully ramified, and compoſed of joints of an oblong figure inſerted into one another. The greater part of theſe are gritty, and of a coral-like matter, but nature varies from this in ſome of the ſpecies, which are of a ſofter ſubſtance.

It is frequently found on the Engliſh coaſts, and what we uſe is in general of our own produce, tho' there is ſome of it brought from France and Holland. It is to be choſen freſh, of a ſtrong ſmell, and greeniſh or reddiſh colour. The ancients extol much the virtues of coralline; at preſent, however, we uſe it only againſt worms, and it is generally mixed with worm-ſeed, ſalt of ſteel, and other of the known anthelminthics.

CORAM Non Judice, in law, is a term uſed where a cauſe is brought and determined in a court of which the judges there have not any juriſdiction.

CORAN or Alcoran. See the article Alcoran.

CORANA, a kind of phaſeolus, or kidney-bean, the down of whoſe pod is the common cow-itch.

CORBAN is a ſcripture term for an offering which had life, in oppoſition to the minchab, which had no life.

Corban is alſo a ceremony which the Mahometans perform at the foot of mount Ararat, in Arabia, near Mecca. It conſiſts in killing a great number of ſheep, and diſtributing them among the poor.

COBEIL, in fortification, the ſame with what we call baſkets. See the article Basket.

CORBEL, in architecture, the repreſentation of a baſket, ſometimes uſed to ſignify the vaſe of a tambour of the Corinthian column.

Corbel, or Corbeil, is alſo uſed in building, for a ſhort piece of timber, placed in a wall, with its end ſticking out ſix or eight inches, as occaſion ſerves, in the manner of a ſhouldering piece. The under part of the end thus ſticking out, is ſometimes cut in the form of a boultin, ſometimes of an ogee, and ſometimes of a face, &c. according as the workman fancies.

CORCHORUS, Jews-ſallad, in botany, a genus of plants, the corolla of which conſiſts of five oblong, obtuſe petals; narroweſt at the bottom, erect, and of the length of the cup: the fruit is a very large, cylindric, acuminated pod, compoſed of five valves, ſometimes only of two, and contains five cells: the ſeeds are numerous, angular, and acuminated.

CORD, or CHORD, ſeveral threads, cabled or twiſted together by means of a wheel. See the article ROPE.

CORD *of St. Francis*, a ſort of rope, adorned with knots, wore by the brothers of the fraternity of St. Francis.

CORD *of Wood*, a certain quantity of wood for burning, ſo called becauſe formerly meaſured with a cord. The dimenſions of a ſtatute cord of wood are eight feet long, four feet high, and four feet broad.

CORD-WOOD, new wood, and ſuch as when brought by water, comes on board a veſſel, in oppoſition to that which is floated.

CORDATED, an appellation frequently given by naturaliſts to things ſomewhat reſembling a heart.

CORDED, in heraldry. A croſs-corded ſome authors take for a croſs wound or wrenched about with cords. See the article CABLED-CROSS.

Others, with more probability, take it for a croſs made of two pieces of cord.

CORDELIER, in church hiſtory, a Franciſcan, or religious of the order of St. Francis.

The Cordeliers are enjoined to live in common: thoſe who are admitted into the order, are firſt to ſell all they have and give it to the poor. The prieſts are to faſt from the feaſt of All Saints till the Nativity.

CORDIAL, in medicine, whatever raiſes the ſpirits, and gives them a ſudden ſtrength and chearfulneſs.

In order to underſtand the operation of this upon a human body, it is neceſſary to conſider, that a languor, or faintneſs, muſt either be the conſequence of too much exerciſe, too long watching, or too great a hurry of the animal functions, as in ſome diſtempers; all which do ſo far diſſipate the nervous fluid, or animal ſpirits, as that the ſolids cannot repeat, with wonted vigour, their neceſſary motions: or ſuch depreſſions muſt ariſe from the obſtruction of ſome natural evacuation, and generally that of perſpiration; or from external cold, which lays a load upon the conſtitution. In both theſe caſes the manner in which a cordial acts is the ſame, ſince it muſt produce its effects by adding to the ſpringineſs and force of the fibres; and as this change is moſt remarkable from ſpirituous liquors, it may be of uſe to examine how they come to obtain ſuch a denomination; and this muſt ariſe from their ſubtility and fineneſs of parts; ſo that the more ſpirituous any thing is that enters the ſtomach, the ſooner one feels its cordial effects: for that increaſe of vigour which a man obtains from common food, though the moſt natural and durable, is not immediately obtained in ſuch a degree, as to get the appellation of cordial, ſince it muſt paſs through ſeveral comminutions before it arrive to ſuch a fineneſs as to be diſperſed to the nerves; whereas a ſpirituous ſubſtance enters into the nerves as ſoon as it touches them, whereby their vibrations are invigorated, and all ſenſe of faintneſs removed. In like manner volatiles, the effluvia of flowers, fruits, and all things deemed cordials, operate upon the organs of ſmelling.

CORDON, in fortification, a row of ſtones made round on the outſide, and ſet between the wall of the fortreſs, which lies aſlope, and the parapet, which ſtands perpendicular, after ſuch a manner, that this difference may not be offenſive to the eye: whence the cordons ſerve only as an ornament, ranging round about the place, being only uſed in fortifications of ſtone-work: for in thoſe made with earth, the void ſpace is filled up with pointed ſtakes.

CORDWAINERS, a term whereby ſhoemakers are denominated in the ſtatutes.

CORDYLA, or CORDYLUS, a name given to the tunny fiſh, while young.

CORDYLUS, a ſpecies of lizard, with five toes on each foot, and a taper tail, covered with denticulated ſquamæ, or ſcales.

CORED HERRINGS, thoſe caught in autumn on the coaſt near Yarmouth; which, being rolled in ſalt, are afterwards brought on ſhore to be made red-herrings.

COREIA, in antiquity, a feſtival in honour of Proſerpine.

CORIANDER, in botany, an umbelliferous plant, with finely divided leaves; producing pale, yellowiſh, or browniſh, ſtriated, hemiſpherical ſeeds, which are joined by the flat ſides, two together. It is annual, a native of Italy, and cultivated in ſome parts of England.

The leaves of coriander have a ſtrong ſmell, ſomewhat of the aromatic kind, but not a little diſagreeable. The ſeeds alſo have, when freſh, a very unpleaſant flavour, which by drying is altered, and becomes tolerably grateful: their taſte, in this dry ſtate, is moderately warm and ſlightly pungent.

The dried ſeeds are ſometimes employed as a ſtomachic and carminative, though leſs frequently than the other warm ſeeds. They give out their virtue totally to rectified ſpirit, but only partially to water: the ſpirituous tincture is of a pale bright yellow colour, the watery infuſion of a deeper browniſh. In diſtillation with water, they yield a ſmall quantity of a yellowiſh eſſential oil, which ſmells ſtrongly and pretty agreeably of the coriander. Pure ſpirit likewiſe carries off, in evaporation or diſtillation, great part of their flavour, the ſpirituous extract proving in taſte as well as in ſmell, conſiderably weaker than the tincture uninſpiſſated.

CORIDOR, or CORRIDOR, in fortification, the ſame with covert-way. See the article COVERT-WAY.

CORINTHIAN, in general, denotes ſomething belonging to Corinth: thus we ſay, Corinthian braſs, Corinthian order, &c.

CORINTHIAN ORDER, in architecture, the fourth order of architecture, according to Scamozzi; but Mr. Le Clerc makes it the fifth, being the moſt noble, rich and delicate of all the other five. See Plate XLIII.

Moſt authors aſcribe the invention of this order to Callimachus, a Corinthian ſculptor. Vilalpandus, however, oppoſes this opinion, and will have the Corinthian capital to have been derived from an order in Solomon's temple, the leaves whereof were thoſe of the palm-tree. The Corinthian order has ſeveral characters by which it is diſtinguiſhed from the reſt. Its capital is adorned with two rows of leaves, between which ariſe little ſtalks, or caulicoles, of which the volutes are formed, which ſupport the abacus, and are ſixteen in number. See ABACUS.

It has no ovolo, nor even abacus, properly ſpeaking; for the member that goes by that name, is quite different from the abacus of the other orders, being cut with a ſweep, in the middle of which is carved a roſe, or other ornament.

Vitruvius obſerves, that the Corinthian order has no particular ordonnance for its corniche, or any of the other ornaments of its entablature; nor does he give it any other proportions than thoſe of the Ionic order; ſo that if it appears higher than the Ionic, it is purely owing to the exceſs of the height of its capital. See the articles IONIC and CAPITAL.

He alſo makes the reſt of the entablature the ſame; and likewiſe uſes the Attic baſe indifferently for the one and the other. But Vitruvius differs widely in this order from all the examples of antiquity now remaining, the moſt beautiful of which have a particular baſe, and the whole order twenty modules high, whereas the Ionic has but eighteen.

Again, its capital is higher than that of Vitruvius by one third of a module; and its entablature, which has modillions, and ſometimes dentils together with the modillions, is very different from the Ionic entablature.

Moſt modern architects paſs by Vitruvius's Corinthian order, and follow that of the ancient buildings; and ſelect from them according to their ſeveral taſtes: ſo that the modern Corinthian is a kind of compoſite, differing from many of the ancient buildings, and much more from Vitruvius. Vignola and Mr. Le Clerc made the Corinthian order twenty modules in height, yet Serlio makes it but eighteen; and M. Perrault eighteen two thirds, retrenching ſomething from the nineteen of Vitruvius. M. Perrault makes the height of the ſhaft leſs than that of the Ionic, by reaſon of the exceſs of its capital.

The CORINTHIAN *Column by equal Parts.* The Corinthian pedeſtal, being in height three diameters, is divided into four, allowing one to the baſe, whoſe plinth is two thirds of it; the other part is divided into nine, allowing two and a half to the torus, a half part to the fillet, three to the cimatium, a half part to the fillet, and two and a half to the ogee; and the breadth of the dye is a diameter, and two thirds.

The height of the baſe of the column is half a diameter, which is divided into ſix, allowing three fourths to the plinth, one to the lower torus, one fourth to the fillet, a half part to the ſcotia, one to the aſtragals and fillets, a half part to the ſcotia, one fourth to the fillet, and the other three fourths to the torus.

For the Corinthian capital, divide the diameter into ſix parts, and take ſeven ſuch parts for the height, allowing two to each height of the leaves, whoſe heads turn down half a part of it; allow another part for the ſtalks, whoſe heads turn down one third of it, three fourths to the ſmall volutes, and one fourth to the fillet; the large volute is as high as the ſaid fillet; a half part to the hollow, and a half part to the ovolo, whoſe fillet has one third of it.

The architrave is divided into nine parts, allowing one and a half to the firſt face, one and one fourth to the ſmall bead, two to the ſecond face, three fourths to the ſmall ogee, two and a half to the third face, a half part to the bead, one to the ogee, and a half part to the fillet. The height of the entablature is two diameters, and is divided into ſix parts, two of which go to the architrave, one and a half to the frieze, and two and a half to the corniche.

The corniche is divided into twelve parts, allowing one and one fourth to the ogee, one fourth to the fillet, one and one fourth to the dentils, one fourth to the fillet, one fourth to the ovolo, one fourth to the fillet, two to the modillions, a half part to the ogee, and one fourth to the fillet; one and three fourths to the corona, three fourths to the cima reverſa, one fourth to the fillet, one and a half to the cima recta, and a half part to the fillet. The projection of the baſe of the Corinthian pedeſtal is equal to its height; the upper fillet has three of theſe parts, and the lower fillet ſeven: the height of its corniche is half the baſe, being one eighth of the whole height; and is divided into eleven, by allowing one and an half to the ogee, a half part to the fillet, three to the cimatium, three to the corona, two to the ogee, and one to the fillet. The projection of the fillet has two of theſe parts; the cimatium, four and a half; the corona ſix and a half; and the whole, eight and a half.

The projection of the baſe of the column is one fifth of the diameter; and the upper fillet has one of theſe ſix parts; the upper torus, and the leſſer fillets have one and a half; and one and three fourths are allowed to the aſtragals and lower fillet.

For the projection of the capital, make a ſquare, each ſide being a diameter and half, and draw diagonals; and towards each angle, mark a diameter from the center, and draw the cants at right angles with the ſaid diagonals: then from the curvature of the abacus, make an equilateral triangle, the part of the ſquare cut off by the cants being the baſe, and the oppoſite angle the center. In the circumference of the column are eight leaves, each leaf having four plants, and each plant five raffles. The projection of their head is found by a ſtraight line from the abacus to the colarino. The roſe is as high as the volute, and projects to the ſide of the foreſaid ſquare.

In the projection of the architrave, the ſecond face has one fourth of a part; the third face, one of thoſe parts; and the whole, two.

As for the projections of the corniche, the ogee is one half of theſe parts, and the dentils two and a half; the dentils are in breadth two thirds of their height, and the ſpaces two thirds of their breadth. The modillions project three and three fourths, and its breadth is one fifth of the diameter, and one being in the center gives the ſpaces. The returned modillions, eight and a half; the cap, nine; the corona, nine and a half; the cima reverſa, ten and a half; and the whole, twelve, being equal to the height.

CORION, in botany, the ſame with the coriander. See CORIANDER.

CORIS, or COWRIES, in commerce. See the article COWRIES.

CORK, or CORK-TREE, *Suber*, in botany, makes a diſtinct genus of trees, according to Tournefort; but is comprehended under the quercus by Linnæus.

In order to peel off the bark, which is the only part that conſtitutes the ſubſtance known by the name of cork, they make an inciſion round both the top and root of the tree, and another longitudinally; and when it is thus got off, they unwarp it before the fire, and preſs it even with weights. This they do once in two or three years, without any prejudice to the tree; provided, however, it be done in a dry ſeaſon, as rainy weather is accounted extremely prejudicial.

The cork ſhould be choſen in fine boards, all of a piece, not full of knots or chinks, of a moderate thickneſs, yellowiſh without and within, and that which cuts even.

Its uſe is too well known to need any account of it: in medicine it is of ſervice to ſtop bleeding, being reduced to powder, or put into ſome aſtringent liquor: burned and mixed with the unguentum populneum, it is very proper for the piles. The Spaniards burn cork into an extraordinary fine black, called Spaniſh black, which is uſed for ſeveral ſorts of work.

CORK, or CORKING *of a Saddle*, the pieces to which the bolſters are made faſt; ſo called as having formerly been made of cork.

CORMORANT, in ornithology, the Engliſh name of a ſpecies of pelican, with fourteen long feathers in the tail, and the under part of the body whitiſh: it is a ſea-fowl, almoſt equal to a gooſe in ſize, and feeds on fiſh. All the writers on birds have deſcribed it under the names of carbo aquaticus, or corvus aquaticus.

CORN, in country affairs, the grain or ſeeds of plants, ſeparated from the ſpica, or ear, and uſed for making bread.

There are ſeveral ſpecies of corn, ſuch as wheat, rye and barley, millet and rice, oats, maize and lentils, peaſe, and a number of other kinds, each of which has its uſefulneſs and propriety. See the articles WHEAT, RYE, BARLEY, &c.

Corn is very different from fruits with reſpect to the manner of its preſervation, and is capable of being preſerved in public granaries, for preſſing occaſions, and of being kept for ſeveral centuries. See the article GRANARY.

CORN-MILL, a water-engine for grinding of corn. See MILL and GRINDING.

CORN, in medicine and ſurgery, a hard tubercle, like a flat wart, growing in ſeveral parts of the feet, eſpecially upon the joints of the toes. This diſorder is not unjuſtly attributed to the wearing of too ſtrait or narrow-toed ſhoes, which never fail to produce theſe tubercles, eſpecially if the perſon is obliged to ſtand or walk much, and in the ſummer-time.

Various are the methods uſed for removing theſe calloſities of the ſkin and cuticle; ſome by knife, and others by application of emollient and cauſtic or eroding medicines; but which way ſoever they are removed, it is certainly the beſt to let their hard ſubſtance be firſt ſufficiently mollified; and this may be obtained by frequently macerating them for a conſiderable time in warm water, and afterwards paring off their uppermoſt ſurface with a penknife: or if this does not ſuffice, let a plaſter of green wax, gum ammoniac. de ſaphon. &c. or a leaf of houſe-leek be applied and renewed every day; when theſe applications have been continued for ſome time, peel them away with your nails, or ſcrape them with a ſcalpel, but with great caution, to avoid injuring any of the ſubjacent tendons of the extenſor muſcle, which might occaſion violent pains, inflammation, convulſions, a gangrene, and even death; all which have alſo been frequently the conſequences of cauſtics penetrating to thoſe parts.

CORNAGE, an ancient tenure, the ſervice whereof was to blow a horn when any invaſion of the Scots was perceived.

CORNEA TUNICA, in anatomy, the ſecond coat of the eye, ſo called from its ſubſtance, which reſembles the horn of a lanthorn. See the article EYE.

The cornea is convex, pellucid, and diviſible into various lamellæ. It is ſituated in the fore-part of the eye, and ſurrounded by the ſclerotica. It has a moſt exquiſite ſenſe, to the end that the tears, upon the leaſt pain, may be ſqueezed out of the lachrymal gland, to waſh off any filth, which, by ſticking to the cornea, might render it dim.

CORNEL-Tree, *Cornus*, in botany. See the article Cornus.

CORNELIAN, *Sarda*, the ſame with carnelian. See Carnelian.

CORNER, *Angulus*, in a general ſenſe, the ſame with angle. See Angle.

Corner-Teeth *of a Horſe*, the four teeth between the middling teeth and the tuſhes, being two above and two below, in each ſide of the jaw, which ſhoot forth when the horſe is four years and a half old.

CORNET, in the military art of the ancients, an inſtrument much in the nature of a trumpet, which, when it only ſounded, the enſigns were to march alone, without the ſoldiers; whereas, when the trumpet only ſounded, the ſoldiers were to move without the enſigns.

Cornet, in the military art of the moderns, the third commiſſion officer in a troop of horſe or dragoons.

This is a very honourable poſt: he commands in the lieutenant's abſence; his principal duty being to carry the ſtandard near the middle of the firſt rank of the ſquadron.

CORNICHE, Cornish, or Cornice, in architecture, the uppermoſt member of the entablature of a column, as that which crowns the order. The corniche is the third grand diviſion of the trabeation, commencing with the frieze, and ending with the cimatium. The corniche is different in different orders, there being as many kinds of corniches as there are different orders of columns. It is moſt plain in the Tuſcan order. Vignola makes it conſiſt of an ovum or quarter-round, an aſtragal or baguette, the reglet or fillet, the larmier, and the talon. See the article Tuscan Order.

In the Ionic, the members are in moſt reſpects the ſame as in the Doric, except that they are frequently enriched with carvings, and have always dentils. See the article Ionic Order.

In the Doric, Vignola makes the capitals of the triglyphs of the frieze, with their bandeletters, a talon, mutules or dentils, a larmier with its guttæ underneath, a talon, fillet cavetto, and reglet. See the article Doric Order.

The Corinthian corniche is the richeſt, and is diſtinguiſhed by having both modillions and dentils, contrary to the opinion of Vitruvius, who looks upon theſe two ornaments as incompatible; and of Mr. Le Clerc, who accounts the dentils as peculiar to the Ionic. See Corinthian Order, and Modillion.

In the Compoſite there are dentils, its mouldings carved, and there are channels under the ſoffit. See the article Composite Order.

Corniche is alſo uſed, in general, for all little projectures in maſonry or joinery, even where there are no columns, as the corniche of a chimney, beaufet, &c.

Architrave-Corniche, that immediately contiguous to the architrave, the frieze being retrenched.

Mutilated Corniche, one whoſe projecture is cut, or interrupted to the right of the larmier: or reduced into a plat-band, with a cimatium.

Cantaliver Corniche, a term uſed by workmen for a corniche that has cantalivers underneath. See the article Cantaliver.

Coving-Corniche, that which has a great caſement or hollow in it, ordinarily lathed and plaſtered upon compaſs-ſprechets, or brackets.

Modillion-Corniche, one with modillions under it. See the article Modillion.

Corniche is alſo uſed for the crownings of pedeſtals. See the article Pedestal.

Corniche-Ring of a piece of ordnance, is that next from the muzzle-ring, backward. See the article Cannon.

CORNICULARIS Processus, the proceſs or knob of the ſhoulder bone, called thus becauſe it reſembles the figure of a crow's beak.

CORNICULARIUS, in Roman antiquity, an officer of the army, appointed to aſſiſt the military tribune in quality of lieutenant.

CORNICULATE, or Corniculated Flower, one with a ſharp-pointed appendage, reſembling, in ſome degree, a cock's ſpur.

Corniculate Plants, the ſame with ſiliquoſe plants with horned pods, or ſeed-veſſels.

CORNISH, or Corniche, in architecture. See the article Corniche.

Cornish Chough. See Chough.

Cornish Diamond. See Diamond.

Cornish Ring, the ſame with aſtragal. See the article Astragal.

CORNU Ammonis, or Hammonis, in natural hiſtory, a genus of foſſile ſhells, called ſerpent-ſtones, or ſnake-ſtones, by the vulgar.

They are found of all ſizes, from the breadth of a ſixpence, to more than two feet in diameter; ſome of them rounded, others greatly compreſſed, and lodged in different ſtrata of ſtones and clays; ſome again are ſmooth, and others ridged in different manners, their ſtriæ and ridges being either ſtraight, irregularly crooked, or undulated.

CORNUCOPIA, or Horn *of Plenty*, among painters, &c. is repreſented under the figure of a large horn, out of which iſſues fruits, flowers, &c. Upon medals the cornucopia is given to all deities, genii, and heroes, to mark the felicity and abundance of all the wealth procured by the goodneſs of the former, or the care and valour of the latter.

Cornucopiæ, in botany, a genus of plants, the flower of which is univalvular; there is no pericarpium, but the corolla incloſes a ſingle turbinated ſeed, convex on one ſide, and plane on the other.

CORNUS, the cornel tree, in botany, a genus of plants, the flower of which conſiſts of four oblong, acute, plane petals; the fruit is a roundiſh umbilicated drupe; the ſeed a cordated or oblong nut, with two cells.

The fruit of this tree is cooling, drying, and aſtringent, ſtrengthens the ſtomach, ſtops all kinds of fluxes and looſeneſs, and is good in fevers, eſpecially if attended with a diarrhœa.

COROLLA, among botaniſts, the moſt conſpicuous part of a flower, ſurrounding the organs of generation, and compoſed of one or more flower-leaves, moſt commonly called petals, to diſtinguiſh them from the leaves of the plant: according as there is one, two, or three of theſe petals, the corolla is ſaid to be monopetalous, dipetalous, tripetalous, &c. See the articles Flower, Petal, &c.

COROLLARY is an uſeful conſequence drawn from ſomething already advanced or demonſtrated: thus, it being demonſtrated that a triangle which has two equal ſides, has alſo two angles equal; this corollary will follow, that a triangle which has three ſides equal, has alſo its three angles equal.

COROLLISTS, *Corolliſtæ*, an appellation given by Linnæus to thoſe botaniſts who have arranged plants under diſtinct claſſes, according to the different form of their corollæ or flowers; ſuch is the celebrated Tournefort and Rivinus. See Botany.

COROLLULA, a term uſed by botaniſts, to expreſs little partial flowers, which together make up the compound ones.

Theſe corollulæ are of two kinds, the tubulated and ligulated; the former whereof are always furniſhed with a campanulated limb, divided into four or five ſegments; and the latter have only a flat linear limb, terminated by a ſingle point, or by a broader extremity, divided into three or five ſegments. See Flower.

CORONA, Crown, or Crowning, in architecture. See Crowning.

Corona, among anatomiſts, denotes that edge of the glans penis where the preputium begins.

Corona, among botaniſts, expreſſes any thing growing on the head of a ſeed.

Theſe coronæ are of various kinds: ſometimes ſimple, conſiſting only of a dentated membrane; ſometimes pappoſe, conſiſting of downy matter; which in ſome caſes is is immediately affixed to the ſeed; in others it has a pedicle growing from it; and it ſometimes is compoſed of ſimple filaments, and ſometimes is ramoſe. Hence, in the deſcription of the ſeeds of plants, they are frequently ſaid to be crowned or winged with down; the uſe of this part being evidently to ſcatter and diſperſe the ſeeds, when ripe.

CORONA BOREALIS, the northern crown, or garland, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars in Ptolemy's catalogue are eight, in Tycho's as many, and in Mr. Flamſtead's twenty-one.

CORONAL, *Coronalis*, in anatomy, the firſt ſuture of the ſkull. See the articles SUTURE and SKULL.

This ſuture reaches tranſverſely from the one temple to the other, and joins the os frontis with the oſſa parietalia.

CORONALE OS, in anatomy, the ſame with the os frontis. See FRONTIS.

CORONARY VESSELS, *Vaſa Coronaria*, in anatomy, certain veſſels which furniſh the ſubſtance of the heart with blood.

CORONARY ARTERIES, are two arteries ſpringing out of the aorta, before it leaves the pericardium.

CORONARY VEIN, a vein diffuſed over the exterior ſurface of the heart. It is formed of ſeveral branches ariſing from all parts of the viſcus, and terminates in the vena cava, whither it conveys the remains of the blood brought by the coronary arteries.

Stomachic CORONARY, a vein inſerted into the trunk of the ſplenic vein, which, by uniting with the meſenteric, forms the vena porta. See the article PORTA.

CORONE, in anatomy, the anterior apophyſis of the lower jaw. See JAW.

CORONER, an ancient officer of the kingdom, ſo called, becauſe he is wholly employed for the king and crown.

The office of coroners eſpecially concerns the pleas of the crown; and they are conſervators of the peace in the county where elected, being uſually two for each county. Their authority is judicial and miniſterial: judicial, where a perſon comes to a violent death; to take and enter appeals of murder, pronounce judgment on outlawries, &c. and to enquire into the lands, goods, and eſcape of murderers, treaſure-trove, wreck of the ſea, deodands, &c. The miniſterial power is, when coroners execute the king's writs, on exception taken to the ſheriff, as being party in a ſuit, of kin to either of the parties, or on the default of the ſheriff, &c. The authority of the coroner does not terminate on the demiſe of the king, as that of judges, &c. does, who act by the king's commiſſion. On default of ſheriffs, coroners are to impannel juries, and to return iſſues on juries not appearing, &c.

CORONET. See the article CROWN.

CORONET, or CRONET *of a horſe*, the loweſt part of the poſtern, which runs round the coffin, and is diſtinguiſhed by the hair joining and covering the upper part of the hoof.

CORPORA CAVERNOSA, in anatomy. See the article CAVERNOSE.

CORPORA OLIVARIA, two protuberances of the medulla oblongata. See the article BRAIN.

CORPORA PYRAMIDALIA, two protuberances of the under part of the cerebellum, ſo called from their reſemblance of a pyramid.

CORPORA STRIATA, two protuberances in the lateral ventricles in the brain. See the article BRAIN

CORPORAL, an inferior officer under a ſerjeant, in a company of foot, who has charge over one of the diviſions, places and relieves centinels, and keeps good order in the corps de garde: he alſo receives the word from the inferior rounds, which paſſes by his corps de garde: there are generally three corporals in each company.

CORPORAL, *Corporale*, in the Chriſtian church, a name for the linen cloth thrown over the conſecrated elements at the celebration of the euchariſt.

CORPORATION, a body politic, or incorporate, ſo called, becauſe the perſons or members are joined into one body, and are qualified to take and grant, &c.

Corporations may be eſtabliſhed three different ways, viz. by preſcription, letters patent, or act of parliament; but are moſt commonly eſtabliſhed by patent or charter.

CORPOREAL, thoſe qualities which denominate a body.

CORPS DE GARDE, a poſt in an army, ſometimes under covert, ſometimes in the open air, to receive a number of ſoldiers, who are relieved from time to time, and are to watch in their turns, for the ſecurity of ſome more conſiderable poſt.

Corps de garde is frequently uſed for the men who watch in this poſt.

CORPS DE BATAILLE, the main body of an army, drawn up in order of battle. See the articles ARMY and GUARD.

CORPS, in architecture, a term to ſignify any part that projects or advances beyond the nakedneſs of a wall, ſerving as a ground for ſome decoration, or the like.

CORPULENCY, in medicine, the ſtate of a perſon too much loaded with fleſh or fat.

CORPUS CALLOSUM, a medullary part of the brain, which covers the whole lateral ventricles. See the article BRAIN.

CORPUS CAVERNOSUM, a cavernous ſubſtance ſurrounding the vagina, which ſwells in the time of coition.

CORPUS PAMPINIFORME, a body formed a little above the teſticles, by the diviſion and reunion of the ſpermatic veins.

CORPUS is alſo uſed in matters of literature, for ſeveral works of the ſame nature, collected together in the form of a ſyſtem of any art or ſcience.

CORPUS CHRISTI, a feſtival of the church, kept on the next Thurſday after Trinity-Sunday, inſtituted in honour of the euchariſt; to which alſo one of the colleges in Oxford is dedicated.

CORPUSCLE, in phyſics, a minute particle, or phyſical atom, being ſuch as compoſe a natural body By this word is not meant the elementary particles, nor the hypoſtatical principles of chemiſts; but ſuch particles, whether of a ſimple or compound nature, whoſe parts will not be diſſolved nor diſſipated by ordinary degrees of heat. Sir Iſaac Newton, in the ſecond book of his Optics, ſhews a way of gueſſing, with great accuracy, at the ſize of the component corpuſcles of bodies. See COLOUR.

CORPUSCULAR PHILOSOPHY, that way of philoſophiſing which endeavours to explain things, and to account for the phænomena of nature by the motion, figure, reſt, poſition, &c. of the corpuſcles, or the minute particles of matter. See the article ATOMICAL PHILOSOPHY.

This philoſophy is ſo very ancient, that, both before Epicurus and Democritus, and even before Leucippus taught in Greece, there was a Phœnician philoſopher, who explained natural phænomena by the motions and affections of the minute corpuſcles of matter, as very old writers inform us: and, therefore, it ſhould rather be called Phœnician philoſophy, than Epicurean.

Mr. Boyle ſums up the chief principles of the corpuſcular hypotheſis, which now flouriſhes under the mechanical philoſophy, in theſe particulars:

1. They ſuppoſe that there is but one catholic or univerſal matter, which is an extended, impenetrable, and diviſible ſubſtance, common to all bodies, and capable of all forms. 2. That this matter, in order to form the vaſt variety of natural bodies, muſt have motion in ſome or all its aſſignable parts; and that this motion was given to matter by God the creator of all things, and has all manner of directions and tendencies. 3. Matter muſt alſo be actually divided into parts, and each of theſe primitive particles, fragments, or atoms of matter, muſt have its proper magnitude or ſize, as alſo its peculiar figure or ſhape. 4. They ſuppoſe alſo that theſe differently ſized and ſhaped particles may have as different orders and poſitions, whereof great variety may ariſe in the compoſition of bodies.

CORRECTION, in printing, implies the pointing out, or diſcovering the faults of a printed ſheet, in order to their being amended by the compoſitor before it is printed off. See PRINTING.

The corrections are placed on the margin of every page, right againſt the line wherein the faults are found; and there are different characters uſed to expreſs different corrections: thus ₰ is put for *dele*, to intimate that ſomething, as a point, letter, word, *&c.* daſhed in that line, is to be taken out. If any thing is to be inſerted, the place is to be marked thus ʌ, and the thing to be inſerted added in the margin. When there are two or more corrections in the ſame line, then they are all ſeparated in the margin by little bars thus |. If a ſpace be omitted, its place is marked with a caret, and the margin thus #. When a letter is inverted, it is expreſſed in the margin thus Ↄ. When any thing is to be tranſpoſed, it is directed thus, *Extraordinary ſcarce ever fail of attainments exciting envy*, for *Extraordinary attainments ſcarce ever fail of exciting envy*, and in the margin is added *tr*. If Italic characters are to be changed forRoman, or *vice verſa*, a line is drawn thus — under the letters, and *rom.* or *ital.* is written in the margin. If a ſpace, or an m or n quadrat, ſtick up, and print black, it is marked in the margin with a daſh, thus |. If a word, ſentence, or paragraph is entirely omitted, the place is marked with a caret, and in the margin is put the word *out*. If the letters of a word ſtand too far aſunder, a line is drawn under them, and in the margin is put a crooked line or hook, thus ◡. There are many other marks uſed in correcting, as ✓ for ſuperior, *cap.* for capital, *l. c.* for lower-caſe, *&c.*

CORRECTION, in the manege, ſignifies aids given with ſeverity.

CORRECTION, in pharmacy, the adding ſome ingredient to a compoſition, in order to check or moderate the violence of the operation.

CORRECTION, in rhetoric. See EPANORTHOSIS.

CORRECTOR, in general, denotes ſomething that mends the faults or bad qualities of others.

CORRECTOR *of the Staple*, a clerk belonging to the ſtaple, whoſe buſineſs is to write down and record the bargains that merchants make there.

CORRECTOR, in medicine and pharmacy, an ingredient in a compoſition, which guards againſt or abates the force of another.

Thus the lixivial ſalts prevent the grievous vellications of reſinous purges, by dividing their particles, and preventing their adheſions to the internal membranes, whereby ſometimes they occaſion intolerable gripings: and thus ſpices and carminative ſeeds alſo aſſiſt in the eaſier operation of ſome cathartics, by diſſipating collections of wind. In the making a medicine, ſuch a thing is alſo called a corrector, as deſtroys or diminiſhes a quality in it, that could not otherwiſe be diſpenſed with: thus turpentine may be called the corrector of quickſilver, by deſtroying its fluxity, and making it thereby capable of mixture; and thus rectified ſpirit of wine breaks off the points of ſome acids, ſo as to make them become ſafe and good remedies which before were deſtructive.

CORRELATIVE, ſomething oppoſed to another in a certain relation. Thus, father and ſon are correlatives. Light and darkneſs, motion and reſt, are correlative and oppoſite terms.

CORROSION, in a general ſenſe, the action of gnawing away, by degrees, the continuity of the parts of bodies.

Acids corrode moſt natural bodies.

CORROSION, in chemiſtry, an action performed on bodies, by means of proper menſtruums, that produce new combinations, and a change of their form, without converting them to fluidity. See the article MENSTRUUM.

The ſubject of this operation, as it is uſed in pharmacy, is principally metals; and the manner in which it is performed is commonly of two kinds: the firſt and moſt ſimple is, when the body to be corroded is put into a fluid menſtruum, and either taken out inſtantly, and put into a moiſt place, as in the method generally practiſed in making a ceruſs; or continued therein till the whole of the matter be corroded, as in the preparation of turbith mineral from the oil of vitriol and mercury. This may properly be called corroſion by immerſion. The other, called in domeſtic chemiſtry, cementation, is performed by expoſing the body to be corroded, to the action of a vapour or ſteam, expelled by heat, from what is uſed as the menſtruum, as in the proceſs given by the Edinburgh Diſpenſatory for the making ceruſs.

There are, nevertheleſs, other methods by which corroſions are, in moſt inſtances, made; as in the rubigo chalybis, of the London Diſpenſatory, where ſprinkling or rubbing of the body over with a menſtruum are ordered in the place of dipping, which the form of ſteel-filings made inconvenient: and ſome others, which from the particular texture of the matter become neceſſary; thus in the corroſion of mercury by ſulphur, in the preparation of æthiops mineral, trituration, or ſometimes fuſion, is employed: and in the chalybis cum ſulphure prep. the heated ſteel is only touched with the ſulphur.

CORROSIVES, in ſurgery, are medicines which corrode whatever part of the body they are applied to: ſuch are burnt-alum, white precipitate of mercury, white vitriol, red precipitate of mercury, butter of antimony, lapis infernalis, &c.

CORRUGATOR, in anatomy, a muſcle which ariſes fleſhy from the proceſs of the os frontis, next the inner or great angle of the orbit, above the joining of the os naſi and the ſuperior proceſs of the os maxillare with this bone; from thence it runs obliquely outwards and upwards, and is inſerted into the fleſhy part of the occipito-frontalis, ſome of its fibrillæ paſſing through into the ſkin, a little higher than the middle region of the eye-brows.

Its uſe is to ſmooth the ſkin of the forehead, by pulling it down after the action of the occipito-frontalis; and when it acts moſt forcibly, it ſerves to wrinkle the ſkin of the front between the ſupercilia, as it happens when we frown, or knit the brows.

CORRUPTICOLÆ, in church-hiſtory, a ſect of heretics, ſo called from their maintaining that the body of Chriſt was corruptible, that the fathers had owned it, and that to deny it was to deny the truth of our Saviour's paſſion.

CORRUPTION, the deſtruction, extinction, or, at leaſt, ceſſation for a time, of the proper mode of exiſtence of any natural body. See PUTREFACTION.

Whenever any body loſes all or any of thoſe accidents, which are eſſentially neceſſary to the conſtituting of ſuch a particular kind, it is then ſaid to be corrupted, or deſtroyed, and loſes its former denomination: but nothing can be deſtroyed of its ſubſtance, or materiality; for as in generation, nothing of matter is produced that did not before exiſt, ſo in corruption, nothing more is loſt beſides that particular modification which was its form, and conſtituted it of ſuch a ſpecies.

Dr. Drake accounts for the corruption of animal and vegetable bodies thus: the principle of corruption is, perhaps, the ſame which in a ſtate of circulation is the principle of life, viz. the air, which is found mixed in conſiderable quantities with all ſorts of fluids, as neceſſary to vegetable as to animal life. Now this air has two motions, viz. an expanſive one, from its natural elaſticity, by means whereof it communicates that inteſtine motion which all juices have, and by which the containing parts are gradually extended, and grow; and a circulary or progreſſive motion, which is not eſſential to it, but is occaſioned by the reſiſtance of the ſolid parts of thoſe bodies, which obliges it to take that courſe that is moſt free and open, which is through the veſſels of animals and plants. Now this courſe being ſtopt, the expanſive motion ſtill remains, and continues to act till, by degrees, it has ſo far overcome the including bodies, as to bring itſelf to an equal degree of expanſion with the external air, which it cannot do without deſtroying the texture and continuity, or ſpecific degree of coheſion, of thoſe ſolids, which is what we call a ſtate of corruption.

The expulſive or deſtructive quality of the air in bodies may be promoted two ways, and therefore corruption accelerated by as many ways, viz. either by weakening the tone or coheſion of the including parts, and ſo facilitating the work of the air, as is the caſe when fruit is bruiſed, which is found to corrupt ſooner than in any other part: or by intending the expanſive force of the air itſelf by heat, or ſome other co-operating circumſtance, and ſo helping it to overcome the reſiſtance the ſooner.

Corruption *of Blood*, in law, an infection accruing to a man's ſtate, attainted of felony and treaſon, and to his iſſue; for as he loſes all to the prince, &c. his iſſue cannot be heirs to him, or to any other anceſtor by him: and if he were noble, his heirs are rendered ignoble.

CORSA, in architecture, the ſame with plat-band. See Plat-band.

CORSAIR, a pirate, or perſon who ſcours the ſea for plunder, with an armed veſſel, without commiſſion from any prince or power. A corſair differs from a privateer, in that the latter acts under a commiſſion, and only attacks the veſſels of thoſe at war with the ſtate whence he had his commiſſion.

CORSELET, a little cuiraſs; or, according to others, an armour or coat made to cover the whole body, anciently worn by the pike-men, uſually placed in the front and flanks of the battle, for the better reſiſting the enemy's aſſaults, and guarding the ſoldiers placed behind them.

CORSEPRESENT, in our old writers, the ſame with mortuary. See Mortuary.

CORSICA, an iſland in the Mediterranean, between 8° and 10° eaſt long. and between 41° and 43° north latitude, about one hundred miles ſouth of Genoa, and ſubject to that republic; though the natives have for many years diſputed their right, and are ſtill in arms againſt them.

CORSNED Bread, a certain ſuperſtitious trial made uſe of among our Saxon anceſtors, by taking a piece of bread, and eating it, with ſolemn oaths and execrations, that it might prove poiſon, or their laſt morſel, if what they aſſerted or denied was not true.

The bread was firſt accurſed by the prieſt, and then offered the ſuſpected criminal, to be ſwallowed by way of purgation, it being believed that it would choak him if he was not innocent.

CORSOIDES, a kind of greyiſh white agat, found in Germany. See Agat.

CORTEX, bark, in botany; ſee Bark.

Cortex *Peruvianus*. See Quinquina.

Cortex *Winteranus*. See Winteranus *Cortex*.

CORTICAL, in a general ſenſe, implies ſomething conſiſting of, or reſembling bark. Thus the cortical part of the brain is that which inveſts the internal or medullary part, like the bark of a tree. See Brain.

CORTUSA, in botany, a genus of plants, the flower of which conſiſts of one rotated petal; the fruit is an ovato-oblong acuminated capſule, furrowed longitudinally on each ſide, with two valves having their ſides involuted, and one cell containing numerous oblong, obtuſe, ſmall ſeeds. The leaves, ſays Dale, promote expectoration.

CORUSCATION, a glittering, or gleam of light iſſuing from any thing. It is principally uſed to ſignify a flaſh of lightning darting from the clouds, during a ſtorm of thunder.

CORVUS, the raven, in ornithology, a genus of birds of the order of the picæ, the diſtinguiſhing character of which is, that the beak is of a convex and cultrated figure, the mandibles nearly equal, and the baſe beſet with hairs.

Corvus *Aquaticus*. See Cormorant.

Corvus, the raven, in aſtronomy, a conſtellation of the ſouthern hemiſphere, conſiſting of ſeven ſtars, according to the catalogues of Ptolemy and Tycho; but of ten, by the Britannic catalogue.

Corvus, in Roman antiquity, a military engine chiefly uſed in boarding the enemy's ſhips.

CORYBANTES, in antiquity, prieſts of the goddeſs Cybele, who, inſpired with a ſacred fury, danced up and down, toſſing their heads, and beating on cymbals, or brazen drums. They inhabited Mount Ida, in the iſland of Crete, where they nouriſhed the infant Jupiter.

CORYLUS, the hazle, in botany; ſee Hazle.

CORYMBYFEROUS *Plants*, in botany, are ſuch as have a compound diſcous flower, but their ſeeds deſtitute of down. They bear their flowers in cluſters, and ſpreading round in the form of an umbrella. Of this kind are the common marygold, common daiſy, camomile, &c.

CORYMBUS, among botaniſts, cluſters of berries, as thoſe of ivy, &c. It is alſo uſed by the modern botaniſts, to ſignify a compound diſcous flower, which does not fly away in down.

CO-SECANT, in geometry, is the ſecant of the complement of any given arch to ninety degrees.

CO-SINE, in trigonometry, is the ſine of the complement of any given arch to ninety degrees.

COSMETIC, in medicine, implies a preparation for ſoftening and whitening the ſkin.

COSMICAL, in aſtronomy, is one of the poetical riſings or ſettings of a ſtar; which is ſaid to riſe coſmically, when it riſes with the ſun, or with that point of the ecliptic, in which the ſun is at that time; and the coſmical ſetting of a ſtar, is when it ſets at ſun riſing.

COSMOGRAPHY, a deſcription of the ſeveral parts of the viſible world; and conſiſts of two parts, aſtronomy and geography.

The word is Greek, κοσμογραφια, and compounded of κοσμος, the world, and γραφω, to deſcribe.

COSMOPOLITE, a citizen of the world, or one who has no fixed reſidence.

COSSE, or Cossic, a word uſed, by old writers, for algebra.

COSSET, among farmers, implies a colt, calf, lamb, &c. brought up by hand, without the dam.

COSTAL, an epithet applied by anatomiſts to ſeveral parts belonging to the ſides.

COSTIVENESS, among phyſicians, a preternatural detention of the fæces, with an unuſual dryneſs and hardneſs thereof.

The moſt effectual method of removing obſtructions of this kind, are gentle purgatives; ſuch as the purging ſalts, manna, lenitive electuary, and emollient clyſters.

COSTMARY, the Engliſh name for a ſpecies of tanſy. See Tanacetum.

COSTS, in law, imply the expences of a ſuit recovered by the plaintiff together with damages.

COSTUME, a rule or precept in painting, by which the artiſt is enjoined to make every perſon and thing ſuſtain its proper character, and not only obſerve the ſtory, but the circumſtances, the ſcene of action, the country or place, and take care that the habits, arms, manners, proportions, and the like, exactly correſpond.

COSTUS, in the materia medica, a root brought from the Eaſt-Indies, about the ſize of the finger, of a pale greyiſh, or whitiſh colour on the outſide, and yellow within. An Arabian, a bitter, and a ſweet coſtus, were formerly diſtinguiſhed in the ſhops: but whether they were, as ſome ſuſpect, the roots of different plants, or, as others, of one and the ſame plant in different ſtates, does not fully appear. At preſent, however, one ſort only is met with, and that but ſeldom.

Coſtus has been recommended as a ſtomachic, uterine, diaphoretic, and diuretic. The editor of the Wirtemburg Pharmacopœia obſerves, that it impregnates the urine like the turpentines, with a violet ſmell; indeed the ſmell of the root itſelf approaches to that of violets, or Florentine orris: its taſte is warm and bitteriſh. But both the ſmell and taſte are confined chiefly to the brittle cortical part, the internal tough woody matter having very little of either.

CO-TANGENT, in geometry, is the tangent of the complement of the given arch to ninety degrees.

COTESIAN *Theorem*, in geometry, an appellation uſed for an elegant property of a circle diſcovered by Mr. Cotes. The theorem is:

If on the diameter AB (plate XLIV. *fig.* 12.) from any point C, in the circle ACB, whoſe center is O, the perpendicular Ck be let fall, and the arch AC be divided into any number m, of equal parts, as Aa, am, &c. and if the whole periphery be alſo divided into the ſame number of equal parts, beginning at the point a, as ab, bc, cd, &c. and from any point P, in the diameter AB, or AB produced, lines being drawn to the points a, b, c, &c. then

[illegible]

[illegible]

300 to 320 pounds. The tare abated in the Antilles is three in the hundred. Cotton being a production applicable to a great variety of manufactures, it cannot be too much cultivated in our own plantations that will admit of it.

In the Swediſh Tranſactions for the year 1747, a method is given of preparing flax, ſo as to reſemble cotton in whiteneſs and ſoftneſs, as well as in coherency: for this purpoſe, a little ſea-water is directed to be put into an iron pot or an untinned copper kettle, and a mixture of equal parts of birch aſhes and quick-lime ſtrewed upon it: a ſmall bundle of flax is to be opened and ſpread upon the ſurface, and covered with more of the mixture, and the ſtratification continued till the veſſel is ſufficiently filled. The whole is then to be boiled with ſea-water for ten hours, freſh quantities of water being occaſionally ſupplied, in proportion to the evaporation, that the matter may never become dry. The boiled flax is to be immediately waſhed in the ſea, by a little at a time, in a baſket, with a ſmooth ſtick: when grown cold enough to be borne by the hands, it muſt be well rubbed, waſhed with ſope, laid to bleach, and turned and watered every day. Repetitions of the waſhing with ſope expedite the bleaching; after which, the flax is to be beat, and again well waſhed: when dry, it is to be worked and carded in the ſame manner as common cotton, and preſſed betwixt two boards for twice twenty-four hours. It is now fully prepared and fit for uſe: it loſes in this proceſs near one half of its weight, which is abundantly compenſated by the improvement made in its quality.

The filamentous parts of different vegetables have been employed in different countries, for the ſame mechanic uſes as hemp and flax among us. Putrefaction deſtroys the pulpy or fleſhy matter, and leaves the tough filaments entire: by curiouſly putrifying the leaf of a plant in water, we obtain the fine flexible fibres, which conſtituted the baſis of the ribs and minute veins, and which now form, as it were, a ſkeleton of the leaf. Alcaline lixivia, in ſome degree, produce ſimilar effects to putrefaction.

The Sieur de Flacourt, in his hiſtory of Madagaſcar, relates, that different kinds of cloth are prepared, in that iſland, from the filaments of the bark of certain trees boiled in ſtrong ley; that ſome of theſe clothes are very fine, and approach to the ſoftneſs of ſilk, but in durability come ſhort of cotton; that others are coarſer and ſtronger, and laſt thrice as long as cotton; and that of theſe, the ſails and cordage of his veſſel were made.

The ſame author informs us, that the ſtalks of nettles are uſed for the like purpoſes in his own country, France. And Sir Hans Sloane relates, in one of his letters to Mr. Ray, that he has been informed by ſeveral, that muſlin and calico, and moſt of the Indian linens, are made of nettles.

In ſome of the Swediſh provinces, a ſtrong kind of cloth is ſaid to be prepared from hop-ſtalks: and in the Tranſactions of the Swediſh Academy for the year 1750, there is an account of an experiment made in conſequence of that report. Of the ſtalks, gathered in autumn, about as much was taken as equalled in bulk a quantity of flax that would have produced a pound after preparation. The ſtalks were put into water, and kept covered therewith during the winter: in March they were taken out, dried in a ſtove, and dreſſed as flax. The prepared filaments weighed very nearly a pound, and proved fine, ſoft, and white: they were ſpun, and woven into ſix ells of fine ſtrong cloth. The author, Mr. Schiſsler, obſerves, that hop-ſtalks take much longer time to rot than flax; and that, if not fully rotted, the woody part will not ſeparate, and the cloth will neither prove white nor fine.

Lavender COTTON, a name by which ſome call the ſantolina of authors. See the article SANTOLINA.

Philoſophic COTTON, a term given to the flowers of zinc, on account of their white colour, and reſemblance to cotton.

Silk COTTON, in botany, the ſame with the xylon of authors. See the article XYLON.

COTULA, in botany, a genus of plants, the compound flower of which is a little convex, and radiated: the hermaphrodite partial flowers ſtand on the diſc, and are very numerous and tubuloſe, with the limb divided into four or five ſegments: the ſtamina are four very ſmall filaments; and the ſeeds, contained in the cup, are ſolitary, and of a trigonal or cordated figure.

COTULA, or COTYLA, in antiquity, a liquid meaſure among the Greeks, equal to the hemina of the Romans, containing half a ſextary, or four acetabula: hence it appears that it contained ten ounces of wine, and nine of oil.

COTURNIX, the quail, in ornithology, a ſpecies of tetrao, with the line of the eye-brows white; ſaid to be the leaſt bird of the whole order of the gallinæ.

It is about the ſize of the fieldfare, and is eſteemed at table.

COTYLA, in anatomy, implies any deep cavity in a bone, in which any other bone is articulated: but it is generally uſed to expreſs the acetabulum, or cavity which receives the head of the thigh-bone. It alſo imports a deep ſinus ſurrounded with large lips.

COTYLEDON, in botany, a genus of plants, the corolla of which is of a campanulato-tubulated form, ſlightly divided into five ſegments, which are rolled back; the fruit conſiſts of five oblong, ventricoſe, acuminated capſules, each formed of a ſingle valve, and opening longitudinally inwards: the ſeeds are numerous and ſmall.

COTYLEDONES, in anatomy, are certain glandular bodies, adhering to the chorion of ſome animals: but no ſuch ſubſtances are obſervable in human bodies, the placenta in the womb ſupplying the place thereof in women. See the article PLACENTA.

COUCH, in painting, a phraſe uſed for each lay or impreſſion of colour, either in oil or water, wherewith the painter covers his canvas, wainſcot, or other matter to be painted.

The word is alſo uſed for a lay or impreſſion on any thing, to make it more firm and conſiſtent, or to ſcreen it from the weather. Thus, paintings are covered with a couch of varniſh; a canvas to be painted muſt have two couches of ſize, before the colours are laid on; two or three couches of white lead are laid on wood, before the gold is applied. The leather-gilders lay a couch of water and whites of eggs on the leather, before they apply the gold or ſilver leaf.

The gold wire-drawers alſo uſe the word couch for the gold or ſilver leaf wherewith they cover the maſs to be gilded or ſilvered. The gilders uſe the term couch, for the quantity of gold and ſilver leaves applied on the metals in gilding and ſilvering.

COUCH, or WET-COUCH, in malt-making. See the article MALT-MAKING.

COUCH GRASS, in botany. See the article GRASS.

COUCHANT, in heraldry, is underſtood of a lion, or other beaſt, when lying down, but with his head raiſed, which diſtinguiſhes the poſture of couchant from dormant, wherein he is ſuppoſed quite ſtretched out and aſleep.

COUCHE, in heraldry, ſignifies any thing lying along: thus, chevron couche, is a chevron lying ſideways, with the two ends on one ſide of the ſhield, which ſhould properly reſt on the baſe.

COUCHING, among ſportſmen, denotes the lodging of a boar. See BOAR.

COUCHING *of a Cataract*, in ſurgery, one of the two chief methods of curing a cataract, by couching with the needle. See the article CATARACT.

When recourſe muſt be had to couching, the method of treating it is as follows: Having placed the patient in a convenient light and poſture, let the other eye be covered to prevent its rolling: then let the ſuperior eye-lid of that eye affected be lifted up, and the inferior one depreſſed: this done, ſtrike the needle through the tunica conjunctiva, ſomething leſs than one tenth of an inch from the cornea, even with the middle of the pupil, into the poſterior chamber; and gently endeavour to depreſs the cataract with the flat ſurface of it. If after it is diſlodged it riſes again, it muſt again and again be puſhed down. If it is membranous, after the diſcharge of the fluid, the pellicle muſt be the more broken and depreſſed.

If it is uniformly fluid, or exceedingly elaſtic, they ſhou not endanger an inflammation by a vain attempt to ſucceed.

Taylor has deſcribed a new method of couching th cataract by the needle: he, ſecuring the affected eye b a ſpeculum oculi, and with a knife, biſtory, or lance makes a longitudinal inciſion, through the membran of the eye, to the vitreous humour, about half a line below the ordinary place: then he directly paſſes a ſlend plano-convex needle into the eye, through the inciſion with the convex part of it turned upwards, to the inferi part of the cryſtalline humour; after which he gentl elevates the point of the needle a little, till he perceives faint reſiſtance from the cryſtalline humour lying abov it, and obſerves its motions through the pupil. When from theſe ſigns, he knows that the apex of the needle i immediately under the capſula of the cryſtalline humour he thruſts it downwards to the bottom, in order to divid the vitreous humour, and prepare a ſpace for the receptio of the cryſtalline humour, which is afterwards to be depreſſed. After this he withdraws about two lines of th needle, and introduces it into the inferior part of the coa of the cryſtalline humour, the ſituation of which he carefully obſerves, &c.

Heiſter remarks upon Taylor's Treatiſe of Couching that it is ſwelled and obſcured with frivolous caution and circumſtances; and that his method of operation i neceſſarily followed with excruciating pains, violent inflammations, and a ſuppuration of the eye, inſtead of recovering the patient's ſight.

After couching, it is thought proper immediately t defend the eye with a compreſs dipt in ſome collyrium ſecured by a handkerchief, that the retina may not be injured by a too ſtrong action of the light; and leſt, b the patient's ſtraining his eye too ſoon, the cataract b elevated again. It will alſo be convenient to bleed the patient a few hours after the operation. With regard t the ſubſequent dreſſings, it will be neceſſary to repeat the former four or five times a day.

COVENANT, a compact or agreement made between two or more perſons, to perform ſomething.

COVENTRY-BELLS, in botany, a name ſometimes uſed for the campanula. See the article CAMPANULA.

COVERING, or ROOFING, in architecture. See the article ROOF.

CO-VERSED SINE, in geometry, the remaining par of the diameter of a circle, after the verſed ſine is taken from it. See the article VERSED SINE.

COVERT-WAY, or CORRIDOR, in fortification, a ſpace of ground, level with the field, on the edge of the ditch, three or four fathoms broad, ranging quite roun the half moons, and other works toward the country. It has a parapet raiſed on a level, together with its banquets and glacis.

The greateſt effort in ſieges, is to make a lodgment on the covert-way, becauſe the beſieged uſually palliſade it along the middle, and undermine it on all ſides.

COVERTURE, in law, is applied to the ſtate and condition of a married woman, who is under the power of her huſband, and therefore called *feme covert*; and diſabled to contract with any perſon to the detriment of herſelf or huſband, without his conſent and privity; or allowance and confirmation thereof.

If the huſband alien the wife's lands, during the marriage, ſhe cannot gainſay it while he lives; ſo that every thing belonging to the wife is in the power of the huſband, inſomuch that ſhe is ſaid to have no power over her own perſon, but is alſo in that ſenſe, *ſub poteſtate viri*.

COUGH, *Tuſſis*, in medicine, a convulſive motion of the diaphragm, muſcles of the larynx, thorax, and abdomen, violently ſhaking, and expelling the air that was drawn into the lungs by inſpiration.

Of theſe convulſive and ſpaſmodic diſorders there are ſeveral kinds, called coughs, proceeding from various cauſes. If the cauſe is in the lungs, there is a difficulty of breathing, which is increaſed upon motion, or agitation of the body or blood: likewiſe there is often a ſhrill voice, a preſſing pain in the breaſt, and a hoarſeneſs. If may declare to, or conceal from, his privy council whatever he thinks fit, and has a ſelect council out of their number commonly called the cabinet council, with whom his majeſty determines ſuch matters as are moſt important, and require the utmoſt ſecrecy. All proclamations from the king and the privy council, ought to be grounded on law, otherwiſe they are not binding to the ſubject.

Privy-counſellors, though but gentlemen, have precedence of all the knights and younger ſons of barons and viſcounts, and are ſtiled right honourable.

COUNCIL *of War*, an aſſembly of the principal officers of an army or fleet, occaſionally called by the general or admiral to concert meaſures for their conduct with regard to ſieges, retreats, engagements, &c.

COUNCIL, in church hiſtory, an aſſembly of prelates and doctors met for the regulating matters relating to the doctrine, or diſcipline, of the church.

National COUNCIL, is an aſſembly of prelates of a nation under their primate or patriarch. See PRIMATE, &c.

Oecumenical or *general* COUNCIL, is an aſſembly which repreſents the whole body of the univerſal church. The Romaniſts reckon eighteen of them; Bullinger, in his treatiſe de Conciliis, ſix; Dr. Prideaux, ſeven; and biſhop Beveridge has increaſed the number to eight, which, he ſays, are all the general councils which have ever been held ſince the time of the firſt Chriſtian emperor. They are as follows: 1. The council of Nice, held in the reign of Conſtantine the Great, on account of the hereſy of Arius. 2. The council of Conſtantinople, called under the reign and by the command of Theodoſius the Great, for much the ſame end that the former council was ſummoned. 3. The council of Epheſus, convened by Theodoſius the Younger, at the ſuit of Neſtorius. 4. The council of Chalcedon, held in the reign of Martianus, which approved of the Eutychian hereſy. 5. The ſecond council of Conſtantinople, aſſembled by the emperor Juſtinian, condemned the three chapters taken out of the books of Theodorus of Mopſueſtia, having firſt decided that it was lawful to anathematize the dead. Some authors tell us, that they likewiſe condemned the ſeveral errors of Origen about the Trinity, the plurality of worlds, and the pre-exiſtence of ſouls. 6. The third council of Conſtantinople, held by the command of Conſtantinus Pogonatus the emperor, in which they received the definitions of the five firſt general councils, and particularly that againſt Origen and Theodorus of Mopſueſtia. 7. The ſecond Nicene council. 8. The fourth council of Conſtantinople, aſſembled when Lewis II. was emperor of the weſt. The regulations which they made are contained in twenty-ſeven canons, the heads of which are ſet down by Mr. Du Pin, to whom the reader is referred.

Provincial COUNCIL, an aſſembly of prelates of a province under the metropolitan.

COUNSELLOR, in general, a perſon who adviſes another: thus we ſay, a counſellor at law, a privy counſellor, &c.

COUNSELLOR *at Law*, a perſon retained by a client to plead his cauſe in a public court of judicature.

COUNT, *Comes*, a nobleman who poſſeſſes a domain erected into a county. The dignity is a medium between that of a duke and a baron. See EARL.

COUNT, in law, ſignifies the original declaration of complaint in a real action, as a declaration is in a perſonal one.

COUNT-WHEEL, in the ſtriking part of a clock, a wheel which moves round once in twelve or twenty-four hours. It is ſometimes called the locking-wheel. See the article CLOCK.

COUNTER, a term which enters into the compoſition of divers words of our language, and generally implies oppoſition; but when applied to deeds, means an exact copy kept by the contrary party, and ſometimes ſigned by both parties.

COUNTER, in naval architecture, an inward arching under a ſhip's ſtern, to which it is parallel; the upper part of which begins directly below the cabin-windows, and the lower-part reaches downwards to the upper-part of the run, or riſing-floor abaſt.

COUNTER-APPROACHES, in fortification, lines and trenches made by the beſieged, in order to attack the works of the beſiegers, or to hinder their approaches.

Line of COUNTER-APPROACH, a trench which the beſieged make from their covert-way to the right and left of the attacks, in order to ſcour the enemies works. This line muſt be perfectly enfiladed from the covert-way and the half moon, that it may be of no ſervice to the enemy, in caſe he get poſſeſſion of it.

COUNTER-BARRY, or CONTRE-BARRE, in heraldry, is the ſame as our bendy ſiniſter per bend counterchanged. See the article BARRY.

COUNTER-BATTERY is a battery raiſed to play upon another to diſmount the guns. See the article BATTERY.

COUNTER-BOND, a bond of indemnification given to one who has given his bond as a ſecurity for another's payment of a debt, or the faithful diſcharge of his office or truſt.

COUNTER-BRACE, in naval affairs, the lee-brace of the fore-top-ſail-yard: it is only diſtinguiſhed by this name at the time of the ſhip's going about, called tacking, at which time, when the ſail begins to ſhiver in the wind, this brace is hauled in to flatten the ſail againſt the lee-ſide of the top-maſt, and increaſe the effort of the wind in forcing her to turn round. See TACKING and STAYS.

COUNTER-CHANGED, in heraldry, is when any field or charge is divided or parted by any line or lines of partition, conſiſting all interchangeably of the ſame tinctures.

COUNTER-CHARGE, a reciprocal charge or recrimination brought againſt an accuſer.

COUNTER-CHEVRONED, a ſhield chevrony, parted by one or more partition lines.

COUNTER-COMPONED, in heraldry, is when the figure is componed of two panes.

COUNTER-DEED, a ſecret writing, either before a notary or under a private ſeal, which deſtroys, invalidates, or alters a public one.

COUNTER-DRAWING, in painting, is the copying a deſign, or painting, by means of a fine linen cloth, an oiled paper, or other tranſparent matter, where the ſtrokes appearing through are followed with a pencil, with or without colour. Sometimes it is done on glaſs, and with frames or nets divided into ſquares with ſilk or with thread, and alſo by means of inſtruments invented for the purpoſe, as the parallelogram.

COUNTER-ERMINE, in heraldry, is the contrary to ermine, being a black field with white ſpots.

COUNTERFEIT-ARCHITECTURE. See the article ARCHITECTURE.

COUNTER-FISSURE. See the article CONTRAFISSURE.

COUNTER-FACED, or CONTRE-FACE, in heraldry, is the ſame that we call barry per pale counterchanged; but then the number of panes into which the field is divided, is always ſpecified.

COUNTER-FOIL, or COUNTER STOCK, in the exchequer, that part of a tally which is kept by an officer of the court. See the article TALLY.

COUNTER-FORTS, ſpurs or buttreſſes ſerving as props to a wall ſubject to bulge or be thrown down.

COUNTER-FUGUE, in muſic, is when the fugues go contrary to one another. See the article FUGUE.

COUNTER-GUARD, in fortification, is a work raiſed before the point of a baſtion, conſiſting of two long faces parallel to the faces of the baſtion, making a ſaliant angle: they are ſometimes of other ſhapes, or otherwiſe ſituated. See the article ENVELOPE.

COUNTER-LIGHT, or CONTRE-JOUR, a light oppoſite to any thing, which makes it appear to diſadvantage. A ſingle counter-light is ſufficient to take away all the beauty of a fine painting.

COUNTER-MARCH, in military affairs, a change of the face or wings of a battalion, by which means thoſe that were in the front came to be in the rear.

It alſo ſignifies returning, or marching back again.

COUNTER-MARK, a mark put upon goods that have been marked before. It is alſo uſed for the ſeveral marks put upon goods belonging to ſeveral perſons, to ſhew that they muſt not be opened but in the preſence of them all or their agents.

Counter-Mine, in war, a well and gallery drove and ſunk till it meet the enemy's mine, to prevent its effect.

Counter-Mure, a wall built cloſe to another, that it may not receive any damage from the contiguous buildings.

Counter-Mure, in fortification. See the article **Contra-Mure.**

Counter-Paled, *Contre-Pallé*, in heraldry, is when the eſcutcheon is divided into twelve pales parted per feſſe, the two colours being counterchanged; ſo that the upper are of one colour, and the lower of another.

Counterpart, in muſic, denotes one part to be applied to another. Thus the baſs is ſaid to be a counterpart to the treble. In law, it is the duplicate or copy of any indenture or deed.

Counter-Passant is when two lions are in a coat of arms, and the one ſeems to go quite the contrary way from the other.

Counter-Plea, in law, a croſs or contrary plea, particularly ſuch as the demandant alledges againſt a tenant in courteſy or dower, who prays the king's aid, &c. for his defence.

Counter-Point, in muſic, the art of compoſing harmony, or of diſpoſing ſeveral parts in ſuch a manner as to make an agreeable whole or a concert. In general, every harmonious compoſition, or compoſition of many parts, is called counter-point. It took its name from hence: before notes of different meaſures were invented, the manner of compoſing was to ſet pricks or points one againſt another, to denote the ſeveral concords.

Counter-point is divided into ſimple and figurative, agreeably to the diviſion of harmony into the harmony of concords and that of diſcords.

Simple counter-point, or the harmony of concords, conſiſts of the perfect as well as the imperfect concords, and may be therefore denominated perfect or imperfect, according as the concords are, whereof it is compoſed. Thus the harmony ariſing from a conjunction of any note with its fifth and octave, is perfect; but with its third and ſixth, imperfect: notwithſtanding this, the compoſition is perfect; it is the particular concords only that are called imperfect. Now to diſpoſe the concords, or the natural notes and their octaves, in any key in a ſimple counter-point, obſerve with regard to the diſtinction into perfect or imperfect harmony, this general rule: To the key, to the fourth, and to the fifth, perfect harmony muſt be joined; to the ſecond, third, and ſeventh, an imperfect harmony is indiſpenſible; to the ſixth, either a perfect or imperfect harmony. But when you keep the key, an imperfect harmony is given the ſixth. In the compoſition of two parts, obſerve, that though a third appears only in the treble, or the fourth and the fifth, yet the perfect harmony of the fifth is always ſuppoſed, and muſt be ſupplied in the accompaniments of the thorough baſs to thoſe fundamental notes.

For the rules of counter-point, with regard to the ſucceſſion of concords, it muſt be obſerved, that as much as can be, the parts may proceed by a contrary motion; that is, the baſs may deſcend where the treble aſcends, and *vice verſa*. If in a ſharp key the baſs deſcends gradually from the fifth to the fourth, the laſt in that caſe muſt never have its proper harmony applied to it, but the notes that were harmony in the preceding fifth, muſt be continued on the fourth: thirds and fifths may follow one another as often as one has a mind.

Figurative counter-point is of two kinds. In one, diſcords are introduced occaſionally as paſſing notes, ſerving only as tranſitions from concord to concord: in the other, the diſcord bears a chief part in the harmony. See **Discord.**

For the firſt, nothing but concords are to be uſed in the accented parts of the meaſure: in the unaccented parts, diſcords may paſs without any offence to the ear. This is called by moſt authors ſuppoſition. See **Supposition.**

For the ſecond, in which the diſcords are uſed as a ſolid and ſubſtantial part of the harmony, the diſcords that have place are the fifth, when joined with the ſixth, to which it ſtands in relation of a diſcord; the fourth, when joined with the fifth; the ninth, which is the effect of the ſecond and ſeventh, and the ſecond and fourth. Theſe diſcords are introduced into harmony with due preparation, and are to be ſucceeded by concords, which is called the reſolution of diſcords. Now to introduce diſcords into harmony, it muſt be conſidered what concord may ſerve for their preparation and reſolution. The fifth then may be prepared either by an octave, fifth, or third, and reſolved either by third or ſixth. The fourth may be prepared in all concords, and may be reſolved into the ſixth, third, or octave. The ninth may be prepared in all concords except an octave, and may be reſolved into third, ſixth, and octave. The ſeventh may be prepared in all concords, and reſolved into third, ſixth, or fifth. The ſecond and fourth are uſed very differently from the reſt, being prepared and reſolved into the baſs.

Counter-Pointed, *Contre-Pointé*, in heraldry, is when two chevrons in one eſcutcheon meet in the points, the one riſing as uſual from the baſe, and the other inverted falling from the chief; ſo that they are counter to one another in the points. They may alſo be counter-pointed when they are founded upon the ſides of the ſhield, and the points meet that way, called counter-pointed in feſſe.

Counterpoise, in the manege, is the liberty of the action and ſeat of a horſeman; ſo that in all the motions made by the horſe, he does not incline his body more to one ſide than to the other, but continues in the middle of the ſaddle, being equally on his ſtirrups, in order to give the horſe the proper and ſeaſonable aids.

Counterpoise is alſo a piece of metal called by ſome the pear, on account of its figure, and the maſs, by reaſon of its weight, which ſliding along the beam, determines the weight of bodies weighed by the ſtatera Romana. See the article **Balance.**

Counter-Poison, an antidote or medicine which prevents the effects of poiſon. See the article **Poison.**

Counter-Potent, *Contre-Potencé*, in heraldry, is reckoned a fur as well as vair and ermine, but compoſed of ſuch pieces as repreſent the tops of crutches, called in French, *potences*, and in old Engliſh, *potents*.

Counter-Proof, in rolling-preſs printing, a print taken off from another freſh printed; which, by being paſſed through the preſs, gives the figure of the former, but inverted. To counter-prove is alſo to paſs a deſign in black lead, or red chalk, through the preſs, after having moiſtened with a ſponge both that and the paper on which the counter-proof is to be taken.

Counter-Quartered, *Contre-ecartelé*, in heraldry, denotes the eſcutcheon, after being quartered, to have each quarter again divided into two.

Counter-Rolls, are the rolls that ſheriffs of counties have with the coroners of their proceedings, as well of appeals as of inqueſts.

Counter-Round, a body of officers going to inſpect the rounds.

Counter-Salient is when two beaſts are borne in a coat leaping from each other directly the contrary way.

Counter-Scarp, in fortification, is properly the exterior talus or ſlope of the ditch; but it is often taken for the covered way and the glacis. In this ſenſe we ſay, the enemy have lodged themſelves on the counterſcarp.

Angle of the **Counter-Scarp**, is that made by the two ſides of the counter-ſcarp meeting before the middle of the curtain.

Counter-Signing, the ſigning the writing of a ſuperior in quality of ſecretary. Thus charters are ſigned by the king, and counterſigned by a ſecretary of ſtate or lord chancellor.

Counter-Swallow-Tail, in fortification, an outwork in form of a ſingle tenaille, wider at the gorge than the head.

Counter-Tally, one of the two tallies upon which any thing is ſcored.

Counter-Tenor, called by the French, *haut-contre*, one of the middle parts of muſic oppoſite to the tenor. See the article **Tenor.**

Counter-Time, in the manege, is the defence or reſiſtance of a horſe that interrupts his cadence, and the meaſure of his manege, occaſioned either by a bad horſeman, or by the malice of the horſe.

COUNTER-TRENCH, in fortification. See the article COUNTER-APPROACHES.

COUNTER-TRIPPING is when two beaſts are borne in a coat in a walking poſture, the head of the one being next the tail of the other.

COUNTER-VALLATION, in the military art, a ditch made round a beſieged place, to prevent the garriſon from making ſallies. See CONTRAVALLATION.

COUNTER-WORKING, the raiſing of works to oppoſe thoſe of the enemy.

COUNTER is alſo the name of a counting-board in a ſhop, and of a piece of metal with a ſtamp on it, uſed in playing at cards.

COUNTER *of a Horſe*, that part of a horſe's forehand which lies between the ſhoulders and under the neck.

COUNTRY, among geographers, is uſed indifferently to denote either a kingdom, province, or leſſer diſtrict. But its moſt frequent uſe is in contradiſtinction to town: thus it is ſaid, that ſuch a man went down into the country.

Among miners, the term countries is an appellation given to works under ground. See the article MINE.

COUNTY, in geography, originally ſignified the territory of a count or earl; but now it is uſed in the ſame ſenſe with ſhire.

England, for the better government thereof, and the more eaſy adminiſtration of juſtice, is divided into fifty-two counties, each of which is ſubdivided into rapes, lathes, wapentakes, and hundreds; and theſe again into tythings. For the execution of the laws in the ſeveral counties, excepting Cumberland, Weſtmoreland, and Durham, every Michaelmas term officers are appointed, called ſheriffs: other officers of the ſeveral counties are lord-lieutenants, cuſtodes rotulorum, juſtices of the peace, bailiffs, high-conſtables, coroners, clerks of the market, &c.

Of the fifty-two counties in England and Wales, there are four termed counties-palatine, viz. Lancaſter, Cheſter, Durham, and Ely: theſe counties are reckoned among the ſuperior courts, and are privileged as to pleas; ſo that no inhabitant of ſuch counties ſhall be compelled by any writ to appear, or anſwer the ſame, except for error, and in caſes of treaſon, &c.

The counties-palatine of Durham and Cheſter are by preſcription, where the king's writs ought not to come, but under the ſeal of the counties-palatine, unleſs it be a writ of proclamation. There is a court of chancery in the counties-palatine of Lancaſter and Durham, over which there are chancellors. See the article CHANCELLOR.

Scotland is divided into thirty-three counties, the government of which is committed to ſheriffs. See the article SHERIFF.

COUNTY-CORPORATE, a title given to ſeveral cities on which the Engliſh monarchs have thought proper to beſtow extraordinary privileges, annexing to them a particular territory of land, or juriſdiction, as the county of Middleſex annexed to the city of London, the county of the city of York, the county of the city of Briſtol, &c.

COUNTY-COURT, a court of juſtice, held every month in each county, by the ſheriff or his deputy.

This court has the determination of debts and treſpaſſes under forty ſhillings.

COUPED, *Coupé*, in heraldry, is uſed to expreſs the head, or any limb, of an animal, cut off from the trunk, ſmooth; diſtinguiſhing it from that which is called erazed, that is, forcibly torn off, and therefore is ragged and uneven.

COUPED is alſo uſed to ſignify ſuch croſſes, bars, bends, chevrons, &c. as do not touch the ſides of the eſcutcheon, but are, as it were, cut off from them.

COUPLE-CLOSS, in heraldry, the fourth part of a chevron, never borne but in pairs, except there be a chevron between them, ſays Guillim, though Bloom gives an inſtance to the contrary.

COUPLET, a diviſion of a hymn, ode, ſong, &c. wherein an equal number, or equal meaſure, of verſes is found in each part, which diviſion, in odes, are called ſtrophes. See the article STROPHE.

Couplet, by an abuſe of the word, is frequently made to ſignify a couple of verſes.

COURANT, or CURRANT, in a general ſenſe, expreſſes the preſent time, as we ſay, the year 1765 is the currant year; the firſt of this currant month, that is, this preſent year and month.

COURANT, in a commercial ſenſe, any thing that has a courſe, or is received in commerce; as the courant coin, &c. alſo the ordinary and known price of goods, &c. in which ſenſe we ſay, the price courant.

COURIER, a meſſenger ſent poſt, or expreſs, to carry diſpatches.

COURLAND, a dutchy ſituated between 21° and 26° of eaſt longitude, and between 56° 30′, and 57° 30′ north latitude. It is bounded by the river Dwina, which divides it from Livonia, on the north; by Lithuania, on the eaſt; by Samogitia, on the ſouth; and by the Baltic ſea, on the weſt; being 130 miles long, and 30 broad.

It is uſually reckoned a part of Poland; but it is to be obſerved, that the Courlanders not only elect their own princes, but are governed by their own laws.

COURSE, in navigation, is the point of the compaſs on which the ſhip ſteers; or the angle intercepted between the tract of the ſhip and the meridian.

When a veſſel begins its courſe, the wind wherewith it is driven makes a certain angle with the meridian of the place; and as we ſhall here ſuppoſe the veſſel follows exactly the direction of the wind, it makes the ſame angle with the meridian which the wind makes. The wind is farther ſuppoſed always the ſame; and becauſe each point, or inſtant of a courſe, may be regarded as the firſt; every moment of the courſe it makes the ſame angle with the wind.

Now a wind that is north-eaſt, v. gr. here, (and by conſequence makes an angle of 45 degrees with our meridian) is north-eaſt wherever it blows; and makes the ſame angle of 45 degrees with all the meridians it meets: and ſince all meridians conſtantly approximate towards each other, till they meet in the pole; and ſince, in moving ever ſo little to the eaſt-ward or weſt-ward, we change our meridian, it follows, that an eaſt or weſt-line in the former place will not be parallel to an eaſt and weſt-line in the latter, but ſomewhat inclined to it: and becauſe the other intermediate rumb-lines always form equal angles with the meridian, they will, conſequently, be inclined to each other.

Now if the diſtances between the meridians be indefinitely ſmall, the very ſmall portions of theſe rumb-lines will, when connected together, form curve-lines on the globe, making equal angles with the meridians; which are the ſeveral paths of a ſhip ſailing according to the direction of the compaſs.

Let P (plate XLIV. *fig.* 13.) repreſent the pole, AQ an arch of the equator, PA a quadrant of the meridian, and the arches *ap*, *cp*, *er*, &c. parallels of latitude, and let the rumb-line A*bdf*, &c. be drawn, forming equal angles with the meridians PA, P*l*, P*m*, &c. Then there will be formed ſeveral triangles, viz. A*ab*, A*lb*, &c. In the firſt of theſe A*b* will be the diſtance ſailed, A*a* the difference of latitude, *ab* the eaſting and weſting, generally called the departure, and the angle *a*A*b* the courſe; alſo in the triangle A*lb*, A*b* will be the diſtance ſailed, as before; *lb* = A*a*, the difference of the latitude; A*l* the difference of the longitude: and becauſe the triangles A*ab*, and A*lb*, are right-angled triangles, the former at *a*, and the latter at *l*; therefore the diſtance ſailed, difference of latitude, and difference of longitude, will form a right-angled triangle: and though theſe triangles, ſtrictly ſpeaking, are curvilinear, yet, as they are very ſmall, they may, without ſenſible error, be conſidered as rectilinear.

Now let us ſuppoſe the ſhip to continue her courſe till ſhe arrive at C, then will AC be the diſtance ſailed, AB the difference of latitude, BC the departure, and AQ the difference of longitude: but the whole departure BC is compounded of the ſeveral intermediate departures *ab*, *cd*, *ef*, &c. and the difference of longitude AQ, of the ſeveral intermediate differences of longitude A*l*, *lm*, *mn*, &c. and becauſe the ſides A*a*, *bc*, *de*, &c. are equal to each other, and alſo the ſides *ab*, *cd*, *ef*, &c. therefore a like diſtance upon the ſame rumb, though in different latitudes, will always have the ſame difference of latitude and departure. But the differences of longitude Al, lm, mn, &c. which correſpond with the equal departures ab, cd, ef, &c. are unequal; therefore an equal diſtance on the ſame rumb, if in different latitudes, will have unequal differences of longitude.

The right-angled triangles fIb, def, bcd, &c. are ſimilar, therefore it will be, As If is to fb, or as radius to the ſecant of the courſe, ſo is $If+de+bc$, &c. the difference of latitude, to $bf+fd+db$, &c. the diſtance run.

Course, in architecture, a continued range of ſtones, level, or of the ſame height throughout the whole length of the building, without being interrupted by any aperture.

Course *of Plinths*, the continuity of a plinth of ſtone, or plaſter, in the face of a building, to mark the ſeparation of the ſtones.

Course is alſo applied for the time ſpent in learning the elements of a ſcience; as a ſtudent is ſaid to go through his courſes of philoſophy, divinity, mathematics, &c. at the univerſity.

COURT, *Curia*, in a law ſenſe, the place where judges diſtribute juſtice, or exerciſe juriſdiction: alſo the aſſembly of judges, jury, &c. in that place.

Court-Baron, a court that every lord of a manor has within his own precincts.

Court *of Chivalry*, or the *Marſhal's* Court, that whereof the judges are the lord high conſtable, and the earl marſhal of England.

Court *of Conſcience*, a court in the cities of London, Weſtminſter, and ſome other places, that determines matters in all caſes, where the debt or damage is under forty ſhillings.

Court *of Delegates*, a court where delegates are appointed by the king's commiſſion, under the great ſeal, upon an appeal to him from the ſentence of an archbiſhop, &c. in eccleſiaſtical cauſes; or of the court of admiralty in any marine cauſe.

Court-Leet, a court ordained for the puniſhment of offences under high-treaſon againſt the crown.

Court-Martial, a court appointed for the puniſhing offences in officers, ſoldiers, and ſailors, the powers of which is regulated by the mutiny bill.

Court *of Requeſts*, was a court of equity, of the ſame nature with the chancery, but inferior to it. It was chiefly inſtituted for the relief of ſuch petitioners as in conſcionable caſes addreſſed themſelves to his majeſty: the lord privy-ſeal was the chief judge of this court.

Court is alſo an appendage to a houſe or habitation, conſiſting of a piece of ground, incloſed with walls, but open at top.

Court is alſo uſed for the palace or place where a king or ſovereign prince reſides.

COURTESY, or Curtesy *of England*, a certain tenure whereby a man marrying an heireſs ſeized of lands of fee ſimple, or fee tail general, or ſeized as heir of the tail ſpecial, and getteth a child by her that cometh alive into the world, though both it and his wife die forthwith; yet if ſhe were in poſſeſſion, he ſhall keep the land during his life, and is called *tenant per legem Angliæ*, or tenant by the courteſy of England; becauſe this privilege is not allowed in any country except Scotland, where it is called *curialitas Scotiæ*.

COUSIN, a term of relation between the children of brothers and ſiſters, who in the firſt generation are called couſin-germans, in the ſecond generation, ſecond couſins, &c. If ſprung from the relations of the father's ſide, they are denominated paternal couſins; if on the mother's, maternal.

COUSINET, in architecture, the ſtone that crowns a piedroit, or pier, the under ſide of which is level, and the upper curved to receive the firſt ſpring of an arch or vault. It is alſo the face on the ſide of the volutes in the Ionic capital, which the French artiſts call baluſtre and orieller.

COUSU, in heraldry, ſignifies a piece of another colour or metal placed on the ordinary, as if it were ſewed on, as the word imports. This is generally of colour upon colour, or metal upon metal, contrary to the general rule of heraldry.

COVERT, in heraldry, denotes ſomething like a piece of hanging, or a pavilion falling over the top of a chief or other ordinary, ſo as not to hide but only to be a covering to it.

COW, in zoology, the female of the ox kind. See the articles Bos and Ox.

The marks of a good cow, according to ſome, are theſe: the forehead ſhould be broad, the eyes black, the horns large and clear, and the neck long and ſtraight. The belly alſo ſhould be large and deep, the thighs thick, the legs round, with ſhort joints, and the feet broad and thick. As to colour, the red cow is ſaid to give the beſt milk, and the black to bring forth the beſt calves; but the cow that gives milk longeſt is the moſt beneficial both for breeding and profit; and the moſt proper time to calve in is March or April.

Before calving, ſhe ſhould be put into good paſture, or, if it happen in winter, ſhould be well fed with hay; and the day and night after ſhe has calved, her drink ſhould be a little warmed.

Cow-Itch, in botany, the Engliſh name of the hairy phaſeolus. See Phaseolus.

Cow's-Lip, *Primula Veris*, in botany; ſee the article Primula.

COWARD, in heraldry, a term given to a lion borne in an eſcutcheon with his tail doubled, or turned in between his legs.

COWL, or Coul, a habit worn by the Bernardines and Benedictines, of which there are two kinds, one white, very large, worn in ceremonies; the other black, worn on ordinary occaſions in the ſtreets, &c.

COXENDIX, in anatomy, a general term for the hip. See the article Hip.

CRAB, in naval affairs, a ſort of wooden pillar let down through a ſhip's decks, having its lower-end reſting in a ſocket called a ſawcer; and in the upper-end two or three holes above one another through the middle of it, into which long bars are let, whoſe length are nearly equal to the breadth of the deck. It is uſed to heave in the cable, or purchaſe any other weighty matter which requires a great mechanical power. This machine differs from a capſtern in having no drum-head, and in having the bars to go entirely through it, and reach from one ſide of the deck to the other; whereas thoſe of the capſtern are more in number, and only reach about eight inches or a foot into the drum-head, according to their different ſizes. See the article Capstern.

Crab's Claws, *Chelæ Cancrorum*, in the materia medica, are the tips of the claws of the common crab, broken off at the verge of the black part, ſo much of the extremity of the claws only being allowed to be uſed in medicine as is tinged with this colour. The blackneſs however is only ſuperficial: they are of a greyiſh white within, and when levigated, furniſh a tolerably white powder.

Crab's claws are of the number of the alkaline abſorbents, but they are ſuperior to the generality of them in ſome degree, as they are found on a chemical analyſis to contain a volatile urinous ſalt. They are always kept in the ſhops levigated to a fine powder, and are ſometimes preſcribed ſingly, though rarely, becauſe of their want of the beautiful white colour of ſome of the others. They are the baſis, however, of the famous Gaſcoigne-powder, the lapis contrayerva, and many other of the compound ſudorific powders.

Crab's Eyes, *Oculi Cancrorum*, in pharmacy, are a ſtrong concretion in the head of the cray-fiſh. They are rounded on one ſide, and depreſſed and ſinuated on the other, conſiderably heavy, moderately hard, and without ſmell. We have them from Holland, Muſcovy, Poland, Denmark, Sweden, and many other places, ſome of them probably taken out of the heads of the animals, but the far greateſt part picked up on the ſhores of the Baltic, and of other ſeas and large rivers.

Crab's eyes are much uſed both in the ſhop medicines and extemporaneous preſcriptions, being accounted not only abſorbent and drying, but alſo diſcuſſive and diuretic.

CRADLE, a well known machine, in which infants are rocked to ſleep.

It denotes alſo that part of the ſtock of a croſs-bow where the bullet is put.

Cradle, in ſurgery, a caſe in which a broken leg is laid after being ſet.

CRAMBE, wild ſea-cabbage, in botany, a genus of plants, the flower of which is tetrapetalous and cruciform: the fruit is a roundiſh capſule, with one cell and two valves, containing a ſingle roundiſh ſeed. This plant is uſed as an aliment like other cabbage, when very young, but is eſteemed more hot and dry. Dale tells us, the leaves heal wounds, and diſcuſs inflammations and other tumours.

CRAMP, in medicine, a convulſive contraction of a muſcular part of the body, being either natural, as in convulſive conſtitutions, or accidental, from living in cold places, under ground, &c. It affects all parts indifferently, but the ham, calves, feet, and toes, oftener than the arms and hands: it is ſeldom mortal, though its returns are often, quick, and continuance long, with great pain and diſtenſion of ſome veſſels, as appears from the knots and ganglions it occaſions. If it be natural, obſerve the cure as in an epilepſy or convulſions; if accidental, it is removed by rubbing the part affected.

Cramp-Fish, the Engliſh name of the torpedo. See the article Torpedo.

Cramp-Iron, or **Cramps**, a piece of iron bent at each end, which ſerves to faſten together pieces of wood, ſtones, or other things.

CRAMPONEE, in heraldry, an epithet given to a croſs which has at each end a cramp or ſquare piece coming from it; that from the arm in chief towards the ſiniſter angle, that from the arm on that ſide downwards, that from the arm in baſe towards the dexter ſide, and that from the dexter arm upwards.

CRANE, a machine greatly uſed in building and commerce for raiſing large ſtones, and other weights.

A crane is an inſtrument of ſuch general uſe, that we cannot avoid giving its deſcription at large. It is of two kinds; in the firſt, only the gibbet moves upon its axis; and in the ſecond, called the rat's-tail crane, the whole crane, with its load, turns upon its axis.

The firſt ſort of crane is repreſented by plate XLVI. *fig*. 1. ſeen in profile, LBED is a ſection of that part of a wharf on which it is fixed, LB being the horizontal line. AC is a ſtrong horizontal piece of timber, making the upper-part of the crane, into which are framed the three upright pieces X, Y, Z; of which the laſt, called the main piece, is ſtronger than the others, with its cill IE, and its braces HI and *b*E, longer and ſtronger than the braces and cills MN and DS of the other two upright pieces, and pinned with iron, where the others are only pinned with wood. When the wharf is not of ſtone-work where the crane is fixed, the three cills muſt be all in one piece, reaching from D to E. Four braces, ſuch as K, join the upright to the horizontal pieces. To the abovementioned horizontal pieces is faſtened, with ſtrong iron pins, a ſhort piece *pp*; having a bell-metal cellar to receive the iron pivot or axis of the upright ſhaft RF, which is an axis in peritrochio, whoſe lower-end of the axis is alſo of iron, turning in another bell-metal collar let into the firm piece of wood F. This axis in peritrochio, inſtead of a wheel, has four bars, *e*, *f*, *d*, and another behind *d*, going through its thicker part, which is eight ſquare, the upper-part being round to receive the rope. When this piece is hooped with iron above and below *d*, it is beſt to uſe but two bars inſtead of four, puſhing them quite through at *eb*, and men at each end go round in the direction *b*O*e*, to wind up the rope, and raiſe the weight at the end of it. This upright wooden axle, with its bars, is called the capſtern of the crane, every ſuch axle being called a capſtern when it turns in a perpendicular ſituation, like that of the capſterns in ſhips, and windleſs when it runs in a horizontal poſition, tho' it ſhould be for the ſame purpoſes as the other; and the rope R*rr*, which goes firſt over the pulley or roller T, then between the pullies P and Q, and laſtly, over the pulley *r*, has at its ends a double iron hook, called a ram's head, to which the goods to be craned up are faſtened. The gibbet CVB is moveable upon its axis CB, by means of the iron center pins or pivots at its ends B and C; ſo that when the weight is raiſed up ſufficiently high, by a ſmall rope faſtened to it, or to the end of the gibbet at *g*, it may eaſily be brought from over the ſhip or barge, ſuppoſed on the water at W, to a cart, or any other carriage on the wharf, towards *w* on the right and left of the piece Z. There is a roof or ſmall wooden ſhed A*a*Q to ſhelter the rope from rain, when the crane is not in uſe, the gibbet being brought under it towards Y.

Fig. 2. ſhews the plane of the upper-part of the crane, or as it would be ſeen from above, where we are to obſerve the poſition of the pullies P and Q, and of the place of the center of the gibbet, which muſt be at C, in a line touching the circumference of both pullies; for if the ſaid center of motion of the gibbet were in a line with the center of the pullies, the gibbet, when loaded, would require a force to bring its end *g* (*fig*. 1.) over the wharf on either ſide, and that force ceaſing to act, the weight and gibbet would run back and reſt over W.

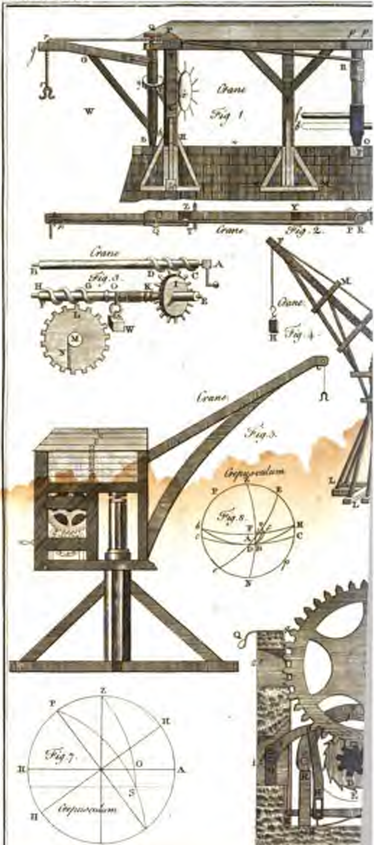
This crane is very expeditious with many hands, it being always requiſite that ſome ſhould ſtand at the bars to keep the weight from running down again, which might be of dangerous conſequence. But if inſtead of the capſtern at O, there was an iron endleſs ſcrew, and horizontal wheel and axle, commonly called the worm and wheel, fixed to the piece X, made very ſtrong for that purpoſe, or a machine in the manner of *fig*. 3. only with a pinion inſtead of a ſcrew at GH, making the axis EF ſhort, and the axis M long, to receive the rope N; then two men at it, nay, ſometimes one man, may eaſily draw goods up from a barge; becauſe, by the reſiſtance of the ſcrew againſt the teeth of the wheel, the machine will hold the weight W, at any height, while the man quits the handle to bring the weight by the guide rope faſtened at *g*, (*fig*. 1.) over a cart on the the wharf to receive it; and yet the weight will go down gently of itſelf, if a man, with a ſudden jerk, ſets the handles a-going the contrary way to that whereby he raiſed the weight which is convenient for loading the cart. N. B. This ſudden impulſe on the handles does to the ſcrew what a blow does to the wedge to ſet it a-going. As this laſt ſort of crane with a worm and wheel does very much increaſe the force of the power, we need not put the reader in mind, that more time muſt be ſpent in raiſing the weight; becauſe the velocity of the weight, compared with that of the man's hand who turns the handle, muſt be diminiſhed in a reciprocal proportion of the intenſity of the weight to the intenſity of the man's force; this being true in all compound, as well as ſimple engines.

Plate XLVI. *fig*. 4. repreſents the rat's-tail crane, not only uſeful in a wharf to crane up heavy goods, but alſo of great ſervice in building, to raiſe great ſtones, and bring them round to any deſigned place. It conſiſts of the following parts: on the croſs-ground cills L, L, L, L, L, L, is ſupported and fixed, by oblique braces, the ſtrong upright piece K, called the gudgeon of the crane, on whoſe upper-part, or ſpindle S, covered with iron, and ſometimes made wholly of iron, the whole machine turns, being eaſily moved, when it is charged with its load H. CA is the counter-wheel with its axis DB, bearing only on the iron ends of the ſaid axis in two hanging perpendicular pieces at B and *b*; *f*F is the brace and ladder whoſe top, F, carries the pulley above the weight, the other pullies being in the ends of the pieces M, N, E; the remaining parts are too plain in the figure to need farther explanation. The power is ſometimes applied by means of a rope on the outer circumference of the wheel A, but moſt commonly men, or an horſe, turn the wheel round by walking in it. Sometimes, alſo, ſtrength is gained by having the counter-wheel made with teeth, and giving motion to its circumference by means of a pinion.

That ingenious mechanic Mr. Padmore made ſeveral improvements in the crane, particularly in a machine of that kind erected on the bank of the river at Bath, by the aſſiſtance of which the late Mr. Allen let down his ſtone into the veſſels that came for it.

The crane itſelf is not of the uncommon ſort, but a rat-tailed crane, with a double axis in peritrochio and two handles, whereby four men may raiſe very great weights; and then, turning the whole crane about upon its upright ſhaft,

PLATE XLVI


Crane
Fig. 1
Crane
Fig. 2
Crane
Fig. 3
Crane
Fig. 4
Crane
Fig. 5
Crepusculum
Fig. 8
Fig. 7
Crepusculum
W
A
B
C
D
G
H
K
L
M
N
O
Q
Z
Y
P
R
E
S
F

ſhaft, can fix it in any poſition, and let down the weights ſpeedily into the boats or barges, which come near the wharf to receive them. See plate XLVI. *fig.* 5. But this conſtruction is not new; neither is it a new invention to let down goods after they have been raiſed by a crane, by preſſing the arch of a circle ſtrongly upon a wheel fixed to the principal axis, in order to retard and regulate the deſcent by a friction increaſed or diminiſhed at pleaſure, as is done in ſtopping wind-mills. The catch alſo, that hinders a crane or capſtern from going back, is of common uſe; but we do not know that any one has applied them both together in the ſame crane, ſo as to depend upon one another, before Mr. Padmore, who was the author of this, did it, though many have done it ſince: therefore we ſhall give a particular deſcription of this invention, whoſe chief intent is to prevent the many accidents which often happen by the careleſſneſs of the men employed to raiſe and let down heavy burthens by the uſe of the crane. The ſixth figure repreſents an upright ſection of ſo much of the crane as the contrivance abovementioned is applied to.

A B is the great wheel, whoſe large axis A, moving on two iron center pins, ſuch as *a*, receives the rope, or lets it run down, according as it is turned, by the means of the handles faſtened at C to the leſſer wheel or pinion C, or as it is ſuffered to turn the other way by the gravity of the deſcending weight, when all obſtacles are removed. Upon the axis of the pinion is the ratchet wheel D, whoſe teeth ſucceſſively receive the iron catch *f* F, moveable on a pin at F on the iron ſtandard G, and to be raiſed up occaſionally by the upright iron H *h*, to hinder the weight from going back when the handles are looſed. Upon the ſame axis behind the wheel D is a wooden wheel E *p*, over which hangs the half-ring of iron O P *o*, with a groove or hollow made in it to fit the circumference of the ſaid wheel, ſo as to retard, or ſtop, or any way regulate the motion of the wheel, and conſequently of the axis and pinion C, and the great wheel and axis A B, which has the rope V A, according as it is more or leſs ſtrongly preſſed down to make a friction on the wood, as it moves after the catch is raiſed out of the teeth of the ratchet. The horizontal lever K L governs all theſe motions in the following manner, viz. When the ſtring Q *q* K, faſtened to the ſaid lever at K, is pulled, the lever, moving on its center M, does, by an horizontal pin fixed at right angles to its ſide at I, raiſe the piece H, and conſequently releaſe the ratchet by raiſing the catch at *f* out of the teeth: then the weight deſcends ſwiftly, moving the wheel and pinion round by its force; but to prevent the too quick deſcent, the lever is pulled up a little more ſtrongly by the guider who holds the ſtring Q *q* K, which brings down the contrary end of the lever L, and conſequently the iron N, ſo low as to make the ſemicircular ring O P *o*, preſs hard upon the wheel E *p*, which it did not do when the catch was raiſed but juſt out of the ratchet. N. B. A ſtrong pull ſtops the whole motion, and a more gentle one regulates the deſcent: and if the guider ſhould be careleſs and let go the ſtring, then immediately the ſtring S *s*, whoſe end *s* had been depreſſed by the end L of the lever, will raiſe it up again by the lateral pin X, and, reſtoring the whole lever to its horizontal poſition, the other lateral pin I, in the long arm M K of the lever, will, through the notch H, preſs upon I, the lower end of the upright piece H, and ſo bring down the catch F *f*, into the ratchet wheel at *f*, the curved piece O P *p* at the ſame time flying up and no longer preſſing the wooden wheel E *p*. Thus no miſchief can ever be the conſequence of careleſſneſs, becauſe of the catch; nor will the weight go down by jerks, which would have been the conſequence of the catch uſed without the half-ring, becauſe the catch is lifted quite out of the way, when the half-ring is brought down and applied by pulling the ſtring at Q. It is neceſſary to remark, that T, *t* 1, *t* 2, is part of the upright ſection of the timber of the frame.

Chimney CRANE, a kitchen utenſil for hanging a pot, or the like, on; and being moveable, wafts it off and on the fire at pleaſure.

CRANE is alſo a name given to the ſiphon. See the article SIPHON.

CRANE's BILL, among ſurgeons, a kind of forceps, ſo called from its figure.

CRANE's BILL, in botany, the Engliſh name of the geranium. See GERANIUM.

CRANK, a contrivance in machines, in manner of an elbow, only of a ſquare form, projecting from a ſpindle, and ſerving by its rotation to raiſe and fall the piſtons of engines.

CRANK likewiſe denotes the iron ſupport for a lanthern, or the like; alſo the iron made faſt to a ſtock of a bell for ringing it.

CRANNY, in glaſs-making, an iron inſtrument, wherewith the necks of glaſſes are formed.

CRAPE, in commerce, a kind of ſtuff, made in the manner of gauze, with raw ſilk, gummed and twiſted in the mill.

CRASIS, among phyſicians, is uſed to ſignify ſuch a due mixture of qualities in a human body, as conſtitutes a ſtate of health.

CRASIS, in grammar, the contraction of two letters into one long one, or a diphthong. Thus αληθεα is contracted into αληθη.

CRASSAMENTUM, in phyſic, the thick red, or fibrous part of the blood, otherwiſe called cruor, in contradiſtinction to the ſerum, or aqueous part. See BLOOD.

CRATCHES, in the manege, a ſwelling on the paſtern, under the fetlock, and ſometimes under the hoof; for which reaſon it is diſtinguiſhed into the ſinew cratches, which affect the ſinew, and thoſe upon the cronet, called quitter-bones.

CRATER, in aſtronomy, a conſtellation of the ſouthern hemiſphere, conſiſting of ſeven ſtars, according to Ptolemy's catalogue, of eight in Tycho's, and eleven in the Britannic catalogue.

CRATICULA, a kind of grid-iron, or chemical inſtrument, made of ſquare pieces of iron, of the thickneſs of one's finger, placed in acute angles, about half a finger's ſpace diſtant from one another. It ſerves in making fires to keep up the coals.

CRAY, a diſtemper in hawks, proceeding from long feeding upon cold ſtale meat.

CRAY-FISH, the Engliſh name of the larger long-tailed ſquillæ. See SQUILLA.

CRAYON, or PASTIL, among painters, implies a compoſition of colours, reduced to the texture of chalk; and uſed dry, in the form and manner of pencils, for painting on paper.

There is conſiderable difficulty and nicety in the making, to bring crayons to that due texture or conſiſtence, which admits of their ſpending freely on the paper, without being ſo crumbly or brittle as to prevent the points from being duly ſharpened: for if they are rendered too coheſive by gums, or ſuch ſubſtances as give them tenacity, they will not caſt as they ought; and on the other hand, if the particles are not ſufficiently bound together, they take no proper hold of the grain of the paper, but lye on it like duſt; and the paſtils in this condition are apt continually to have the points broken, or moulder away on the leaſt uſe, to an undue thickneſs.

All the colours which are pigments, and can be reduced to an impalpable powder, may be uſed for forming crayons: but it is proper, nevertheleſs, to be cautious, eſpecially in more elaborate works and paintings of any value, with regard to ſuch as are ſubject to fly or change, particularly roſe pink, Engliſh pink, lake, and Pruſſian blue, which are apt to turn pale, and ſometimes entirely loſe their hue: and with reſpect to white, the uſe of flake white, or white lead, is beſt avoided, on account of their frequently turning black; as there are others which will even work better, and are no way liable to any ſuch change: but neither lake, nor Pruſſian blue, are to be wholly rejected for this purpoſe, when they are known to be thoroughly good; as they will ſtand extremely well when prepared in a right manner; only great care ſhould be taken to be certain of the qualities of any parcel before it be uſed, as the far greater part of the lake to be now met with will fly; and the Pruſſian blue turn pale and green in ſuch a manner as to vary the teint greatly from its original ſtate.

Beſides the coloured pigments, which are uſed ſimply, ſome white ſubſtances are neceſſary for the forming of a proper body to ſuch as are of lighter teints; or where the colours are to be diluted and weakened, as in ſtraw-colours, pinks, carnations, &c. There have been many different ſorts of bodies applied to this purpoſe, which, moſt of them, by proper management, may be made to anſwer the end. The principal are flake white, white lead, tobacco-pipe clay, plaſter of Paris, Spaniſh or troy white, ſimple chalk, and ſtarch: but pearl white, that has been hitherto over-looked, is in ſome caſes ſuperior to any of them. In this application of white bodies to form the ground or baſis of pale-coloured crayons, the greateſt care ſhould be taken, likewiſe, when carmine lake, or any coloured pigment prepared from parts of vegetables or animals are uſed, that the ſubſtance employed be ſuch as will not prey upon or change the colour; which chalk, flake white, and white lead, with theſe colours, are extremely apt to do, when they are mixed together with the addition of any moiſture: but in all ſuch caſes the pearl white, and plaſter of Paris, ſhould be uſed; and with reſpect to the latter, it muſt be wholly free from lime, or it will be worſe even than the others. It is beſt, indeed, in general, to avoid any ſuch mixture of theſe colours, by ſubſtituting the coloured earths, or other mineral ſubſtances, in the place of thoſe prepared from vegetable or animal ſubſtances; as they can ſcarcely be affected or changed by any matter uſed in painting; and will, in general, equally well anſwer the purpoſe, except in the caſe of carmine, the unrivalled brightneſs of which makes it neceſſary for pinks and carnations, as great purity and force of colour are there required.

Chalk is the beſt adapted by its texture to forming the ground of pale crayons of any of the whites hitherto uſed; as it will caſt more freely, and at the ſame time retain a due coheſion, when mixed with proper binders or glutens, better than any of the other whites now in practice. It is, therefore, much the beſt ſubſtance for mixing with all the coloured pigments which are not ſubject to be changed; but with reſpect to ſuch as are, the pearl white, or plaſter of Paris, ſhould be ſubſtituted in its place. It is alſo the beſt for forming white crayons for common purpoſes.

Starch has been frequently uſed along with ſome of the other whites for giving a due texture to crayons: but it is no where neceſſary, except in the caſe of white flake; and as the prepared flake white of the ſhops contains a large proportion, it is unneceſſary when that is uſed, which will generally be the caſe, as the levigation of the white flake is too troubleſome for thoſe who do not make ſuch matters their buſineſs.

The laſt claſs of ſubſtances uſed in the compoſition of crayons, and on which indeed principally depends their perfection, is the binders or glutens required to give pulverine bodies, of which the crayons are compoſed, a due tenacity, to render them capable of being formed into maſſes that will bear the form and employment of pencils. There has been a variety of different matters applied to this purpoſe; moſt of which may in ſome degree effect it; but the principal are, alewort, gum-tragacanth, gum-arabic, ſize, milk, oatmeal, ſugar-candy, olive-oil, and linſeed-oil.

The wort of ale or beer, either in its original ſtate, or rendered more thick by boiling, has been found to anſwer the end of a binder, for the forming crayons where chalk or earthy bodies are uſed, better than any of the others; as it gives them a proper coheſion, by its viſcidity, without drying to that brittle ſtate to which the gums are ſubject. It is not, however, in the caſe of vermilion, and ſome other ſubſtances, which have no coheſive attraction of themſelves, ſufficient alone to give the due tenacity; and muſt therefore be aſſiſted by gum-tragacanth, or ſize, or ſome ſuch other viſcid matter.

Gum-tragacanth is uſed as a binder, by diſſolving it in the alewort, or whatever fluid is employed for the tempering crayons. It is preferable, for this purpoſe, to gum-arabic, or the other gums which diſſolve in aqueous fluids; becauſe it thickens in the water, and mixes itſelf equally throughout the whole ſubſtance of the compoſition when dry; whereas the others are apt to form a cruſt on the outſide of the maſs, and render the paſtils or crayons of an unequal texture.

Gum-arabic has been alſo uſed for tempering crayons in the ſame view as gum-tragacanth; and differs not greatly from it in its effect.

Milk has been uſed for the compoſition of crayons, in the ſame view as the ale-wort, where only a ſmall addition of coheſive power was required to be added to the ſolid bodies which formed them; but it is only in ſuch caſes it can be of any avail, as the ale-wort, or others of greater efficacy, are in moſt caſes wanted.

Oatmeal, or rather the decoction of it, made as in the caſe of water-gruel and ſtrained, has likewiſe been employed for the ſame end as milk; and anſwers well enough in the caſe of the deep Pruſſian blue, indico, and ſuch bodies as are apt to dry gummy; becauſe though the decoction of oatmeal gives only a ſmall degree of coheſion, yet it prevents that coaleſcence from the attraction of the parts of thoſe bodies on each other, which produces this brittleneſs.

Olive oil, as likewiſe the linſeed, have been uſed to give the crayons a more flaky and chalky texture, by dipping into it, after they have been duly heated, ſuch as are made of plaſter of Paris, or tobacco-pipe clay, in order to ſoften them, and remove that unkindly coheſion which prevents the ſticking freely on the paper.

White Crayons. — For forming white crayons for common purpoſes, chalk, in its natural ſtate, is ſuperior to any compoſition: it ſhould be choſen white, pure, and of the moſt cohering texture; and it muſt be cut firſt into ſquares, by means of ſmall ſaws made for this uſe of three inches length, and a quarter of an inch in thickneſs; and afterwards formed into a proper pencil ſhape, by taking off the corners with a penknife, and duly ſloping the point.

Where an extraordinary degree of whiteneſs is required, a crayon may be made from flake white, as prepared by the colourmen; which being well powdered and moiſtened with milk, to the conſiſtence of a paſte, muſt be formed in the pencil ſhape, and then dried, but without heat, as that would tend to injure the whiteneſs.

Red Crayons. — For red crayons of the ſcarlet hue, vermilion and red lead may be uſed, with ale-wort boiled, till it appear ſlightly glutinous to the touch, and further inſpiſſated by the addition of gum-tragacanth; the proportion of which may be a ſcruple to a pint of the thick wort. With this gluten, the vermilion, or red lead, muſt be reduced to the ſtate of a paſte, by grinding them together, and then formed into the proper ſhape, and dried with a gentle heat.

Where the orange caſt of red lead is not particularly wanted, it is ſafer to uſe vermilion; for though red lead will ſtand much better uſed this way than in oil, yet the vermilion is ſtill more ſecure, as nothing can change it without a burning heat.

The ſcarlet oker gives a fouler red crayon, but yet very uſeful, if it be compounded with the ale-wort inſpiſſated both by boiling and the addition of gum-tragacanth, in the proper manner directed for vermilion.

Common Indian red may be likewiſe treated in a parallel manner, and will give other teints of red.

Red oker requires no compoſition; but if it be choſen pure, and of a good colour, will afford uſeful crayons by the ſame management as chalk.

Lake muſt be uſed for crimſon crayons, and may be brought, when well ground with ale-wort, to a proper texture; but if, as is the nature of ſome parcels, it appear too gummy, make it up with the decoction of oatmeal, inſtead of the ale-wort.

It would be extremely proper to have crayons of carmine, if the price did not make the uſe of it too expenſive: conſidering that circumſtance, it is more expedient to uſe it rubbed in by a leather roller, by which it may be conveniently laid on where it may be neceſſary.

A ſmall crayon compounded of the beſt and moſt ſcarlet lake, with about a third part of carmine, ſhould however not be wanting. They may be worked up with milk, and a little decoction of oatmeal, with a ſmall proportion of gum-tragacanth; but ſome carmine is ſufciently glutinous, and requires no binder, which ought therefore to be firſt tried before the binders are added.

Small crayons muſt likewiſe be made of carmine, and pearl white, in different proportions; and the ale-wort muſt be more or leſs inſpiſſated, according to the quantity of white; but as the carmine differs greatly in different parcels as to its gummy conſiſtence, this muſt be regulated by diſcretion.

Blue CRAYONS. — For a deep blue crayon, the darkeſt Pruſſian blue may be formed into a crayon by grinding it with the decoction of oatmeal. If the tenacity be not ſufficient, the ale-wort muſt be added.

Indico, when good, will likewiſe produce a deep blue crayon, with ale-wort inſpiſſated by boiling.

For paler blues, Pruſſian blue of different degrees of lightneſs may be uſed with ale-wort; but the ale-wort muſt be inſpiſſated by boiling, or the addition of ſize or gum-tragacanth, in proportion to the lightneſs, the darker kinds of Pruſſian blue being of a more glutinous nature than the lighter.

Verditer will alſo make a good blue crayon: but it muſt be uſed with ale-wort ſtrongly inſpiſſated.

Bice ſhould likewiſe compoſe another crayon, treated as verditer.

Ultramarine being too dear to form crayons, ſhould be uſed in the manner above directed for carmine.

Yellow CRAYONS.—The prepared orpiment, or pigment, called king's yellow, forms the brighteſt and fulleſt coloured yellow crayons; but the poiſonous quality, and garlick ſcent of it, are ſuch faults as render it on the whole much inferior to that next mentioned.

The king's yellow may, however, be formed into a crayon with ale-wort inſpiſſated by boiling, and the addition of gum-tragacanth; but it muſt be dried without any heat.

The turpeth mineral well levigated, and waſhed over, makes a very fine crayon, of a cool, but very bright colour. It may be treated for this end exactly in the manner above-directed for vermilion.

Dutch pink and Engliſh pink make crayons of a pretty good yellow colour; but are not ſo ſecure from flying as the two above-mentioned.

Yellow oker may alſo be formed into a crayon in the ſame manner as chalk; or it may be ground and waſhed over, and then uſed with the inſpiſſated ale-wort.

Green CRAYONS.—The chryſtals of verdigriſe, properly managed, make the brighteſt green crayon. They ſhould be reduced to a very fine powder, by grinding on the ſtone with ſpirit of wine, or oil of turpentine; and then formed into a paſte by ale-wort highly boiled, and inſpiſſated ſtill further by gum tragacanth: but as little fluid as poſſible ſhould be employed in their compoſition. They ſhould likewiſe be dried without heat.

Pruſſian blue, and turpeth mineral, compounded in different proportions, form alſo a variety of good green crayons. They muſt be worked up with ale-wort thickened by boiling.

Verditer and turpeth mineral form a good pale green: but they require ale-wort, both thickened by boiling and the addition of gum-tragacanth.

Orange CRAYONS.—King's yellow, or turpeth mineral, with red-lead, or vermilion, makes a bright orange crayon. They muſt be compounded with ale-wort thickened as well by gum-tragacanth as boiling.

Orange crayons may likewiſe be formed from Dutch or Engliſh pink, compounded with red-lead, or vermilion: but the ale-wort need not, in this compoſition, be ſo ſtrongly inſpiſſated as for the laſt.

Purple CRAYONS.—A very bright purple crayon may be formed of deep Pruſſian blue, and carmine, compounded by means of the decoction of oatmeal: but this being expenſive muſt be made ſmall, and reſerved only for thoſe caſes where great brightneſs is neceſſary.

Deep Pruſſian blue and lake, treated as the above, form a crayon next in brightneſs to the above.

For a leſs bright purple, indico may be uſed in the place of the Pruſſian blue; but the teint will not be ſo deep; and ale-wort ſlightly inſpiſſated may be uſed inſtead of the decoction of oatmeal.

Brown CRAYONS.—For forming a full brown crayon, neither inclining to the olive nor orange, mix brown oker and biſtre, and work them up with the ale-wort inſpiſſated moderately by boiling.

Spaniſh-brown, umbre, and the common and true Indian red, may likewiſe be compounded in the ſame manner with biſtre, into crayons of different teints of brown; and ivoy-black may be added, where neceſſary, to darken them, and increaſe the variety.

Spaniſh-brown and umbre may be likewiſe formed alone into brown crayons, by means of the ale-wort inſpiſſated by boiling and a ſmall addition of gum-tragacanth.

For diluted browns, calcined fuller's-earth may be employed, either alone, or mixt with chalk in different proportions. The crayons muſt be formed by means of ale-wort moderately inſpiſſated by boiling.

Black and *Grey* CRAYONS.—Black crayons may be formed out of pieces of charcoal well burnt, by cutting them into a proper ſhape, in the manner directed for chalk. The kind of charcoal ſaid to be the beſt for this purpoſe, is that made from the wood of the willow.

Good black crayons may likewiſe be formed of ivory-black mixt with a little very deep Pruſſian blue or indico. It muſt be worked up by ale-wort boiled thick, with a ſmall addition of glovers ſize.

Grey crayons may be formed of the ivory, or lamp-black, mixt with chalk in different proportions, and compounded by means of ale-wort well inſpiſſated by boiling.

CREAM, the fat part of the milk that ſwims upon the ſurface. See MILK.

CREAM *of Tartar*, called alſo cryſtals of tartar, in pharmacy, a preparation of tartar made in the following manner:

Take any quantity of crude tartar, boil it in water, till the parts which are capable of ſolution be entirely diſſolved; filter the liquor whilſt hot through a flannel bag into an earthen-pan, and evaporate till a pellicle appears, then ſet it in a cold place, and ſuffer it to ſtand quietly two or three days: afterwards decant the fluid, and the cryſtals will be found adhering to the pan: ſcrape them off, and evaporate the fluid as before, and ſet it again to cryſtalliſe, and repeat the operation till all the cryſtals are formed. Cream of tartar is a gentle purge. It attenuates and reſolves tough humours, and is good againſt obſtructions of the viſcera, and in cachectic complaints. It is alſo a good adjunct to chalybeate medicines.

CREAT, in the manege, an uſher to a riding-maſter; or, a gentleman bred in the academy, with intent to make himſelf capable of teaching the art of riding the great horſe.

CREATION, the producing ſomething out of nothing, which ſtrictly and properly is the effect of the power of God alone, all other creations being only transformations, or change of ſhape. Creation, ſay the ſchoolmen, from no pre-exiſting ſubject, may be underſtood in different ſenſes. 1. That is ſaid to be created out of no pre-exiſting matter, in the production of which no matter is employed; as an angel. 2. Although matter may be employed in the production of a thing, it may be ſo produced as that both its matter and form are cauſed by the ſame agent at the ſame time. In this manner were the heaven and the earth created in the opinion of thoſe who deny that God made the chaos. 3. Although matter may be the ſubject in producing a thing, yet that thing may not depend on matter either with reſpect to its future or preſent exiſtence. Such is the human ſoul, for although it is created in pre-exiſting matter, it is not created out of pre-exiſting matter, but of nothing, and therefore is no ways dependent on matter for exiſtence. See the article WORLD.

Epocha of the CREATION. See the article EPOCHA.

CREATION, in the Romiſh church, the re-production of the humanity of Jeſus Chriſt in the euchariſt, by the words of the conſecration.

CREDENTIALS, letters of recommendation, and power, eſpecially ſuch as are given to ambaſſadors, or public miniſters, by the prince or ſtate that ſends them to foreign courts.

CREDIBILITY, a ſpecies or kind of evidence, leſs indeed than abſolute certainty or demonſtration, but greater than mere poſſibility: it is nearly allied to probability, and ſeems to be a mean between poſſibility and demonſtration. See the article Evidence.

CREDIT, in commerce, a mutual truſt or loan of merchandize, or money, on the reputation of the probity and ſufficiency of a dealer.

CREDITOR, a perſon to whom any ſum of money is due, either by obligation, promiſe, or otherwiſe.

Creditor, in book-keeping. See the article Book-keeping.

CREED, a brief ſummary of the articles of a Chriſtian's belief.

CREEK, the part of a haven where any thing is landed from the ſea.

CREEPER, in ornithology, a name given to ſeveral ſpecies of iſpida, otherwiſe called certhia, or certhius, and in Engliſh, the ox-eye.

Creeper, in naval affairs, a ſmall inſtrument of iron, having a ſhank and four hooks or claws, and ſomething reſembling a grappling. It is uſed to throw into the bottom of any river or harbour, with a rope faſtened to it, to hook and draw up any thing from the bottom. See Grappling.

CREMASTER, in anatomy, the name of a muſcle of the teſticle, of which there is one on each ſide.

It ariſes fleſhy from the loweſt and fore-part of the os ilium, and upper part of the ligamentum pubis: its fibres running parallel with thoſe of the oblique aſcendens, and almoſt encompaſſing the proceſs of the peritonæum, deſcends with it, and is inſerted into the tunica vaginalis, upon which it ſpreads in ſeveral diſtinct portions.

CRENATED, among botaniſts, is ſaid of leaves, the edges of which are furniſhed with indentings, contiguous to each other, and neither inclining toward the point nor baſe. Of theſe ſome are acute, others obtuſe, &c.

CRENELLE, or Imbattled, in heraldry, is uſed when any honourable ordinary is drawn, like the battlements on a wall to defend men from the enemies ſhot.

CREPUSCULUM, in aſtronomy, twilight; the time from the firſt dawn or appearance of the morning, to the riſing of the ſun; and again, between the ſetting of the ſun, and the laſt remains of day.

Papias derives the word from *creperus*; which he ſays anciently ſignified *uncertain, doubtful*, q. d. a dubious light.

The rays of the ſun, being ſcattered over ſome of thoſe parts of the air which are within our viſible horizon, cauſe the twilight, both morning and evening: the morning twilight begins when the ſun is not more than about 18° below our rational horizon; for then his rays firſt reach the eaſtern parts of the air within our viſible horizon: as he grows nearer riſing, his light ſpreads farther round, and enlightens a larger portion of our air, and it grows lighter and lighter, till ſun-riſe: in like manner after ſun-ſet the light gradually decreaſes, till the ſun is got ſo low that none of his rays can reach the weſtern parts of the air within our viſible horizon, or not enough to cauſe any ſenſible light there; and then the evening twilight ends: this happens, when the ſun's depreſſion below the rational horizon is about 18°. There is ſome little difference between the duration of the twilight, ariſing from the different denſity and height of the atmoſphere, by which the vapours and other particles that reflect the light of the ſun, are carried up to a greater height at ſome times than at others; for the higher the reflecting particles are raiſed, the lower may the ſun be depreſſed, and yet have his rays reach them: for this reaſon the evening twilight ends at a lower depreſſion of the ſun than the morning twilight begins at; becauſe the heat of the day, by rarifying the air, raiſes the reflecting particles to a greater height; whereas the coolneſs of the night, by condenſing the air, brings them down nearer to the earth: this cauſes the evening twilight to be longer than the morning, at the ſame time of the year in the ſame place: for the ſame reaſon the twilight is longer in hot weather than in cold, as alſo in hot countries than in cold, other circumſtances being the ſame. Ricciolus at Bologna obſerved, at the equinoxes, the duration of the twilight in the morning to be 1 hour and 47 minutes; in the evening two hours: and that the evening twilight did not end till the ſun was above 20° below the horizon: however, the differences in the ſame country, ariſing from this cauſe, are ſo ſmall, that they are generally not taken notice of.

Kepler, indeed, aſſigns another cauſe of the crepuſculum, viz. the luminous matter around the ſun, which, ariſing near the horizon, in a circular figure, exhibits the crepuſculum; in no-wiſe, as he would ſhew, owing to the refraction of the atmoſphere.

The depth of the ſun below the horizon, at the beginning of the morning crepuſculum, or end of the evening one, is determined in the ſame manner as the arch of viſion, viz. by obſerving the moment wherein the air firſt begins to ſhine in the morning crepuſculum, and that wherein it ceaſes in the evening; and finding the ſun's place for that moment.

Alhazen found it 19 degrees; Tycho, 17°; Rothmanaus, 24°; Stevenius, 18°; Caſſini, 15; Ricciolus, in the equinox in the morning, 16°, in the evening 20°. 30′; in the ſummer ſolſtice in the morning, 21°. 25′, in the winter ſolſtice in the morning, 17°. 25′.

Nor need we wonder at this difference amongſt aſtronomers, the cauſe of the crepuſculum being inconſtant; for if the exhalations in the atmoſphere be either more copious, or higher, than ordinary, the morning crepuſculum will begin ſooner, and the evening hold longer, than uſual; for the more copious the exhalations are, the more rays will they reflect, conſequently the more will they ſhine; and the higher they are, the ſooner they will be illumined by the ſun. To this it may be added, that in a denſer air, the refraction is greater, and that not only the brightneſs of the atmoſphere is variable, but alſo its height from the earth.

Hence, when the difference between the ſun's declination and the depth of the equator is leſs than 18°, and does not, in effect, exceed 15°, the crepuſculum will continue the whole night.

The elevation of the pole P R (plate XLVI. *fig.* 7.) and the ſun's declination O S, being given, to find the beginning of the morning crepuſculum, or end of the evening. Since in the triangle P Z S the ſeveral ſides are given, viz. P Z the complement of the elevation of the pole P R, and P S the complement of the declination O S, and S Z the aggregate of the quadrant Z D, and the ſun's depth D S; find the angle Z P S, whoſe meaſure is the arch A O. Convert A O in ſolar time: thus you have the time elapſed from the beginning of the morning crepuſculum, to noon; from this ſubtract the time of ſun-riſing from noon, the remainder will be the time of the duration of the morning twilight.

To determine the time of the year when the duration of twilight is the ſhorteſt poſſible.

Let P Z E N P (*fig.* 8.) repreſent the meridian, P and *p* the poles of the equator E *ae*, H *o b* the horizon, *e* the true eaſt point, Z the zenith, N the nadir, C *c* the crepuſcular circle, H B *b* the circle of depreſſion, Z F B a vertical circle meeting the horizon in F, and the equator in A. Let B *y* be a part of the ecliptic meeting the equator in *y*, and B *f* a part of the ſun's parallel: now it is evident that the triangles A B D, A F O, are equal, and therefore A F = A B, and A O = A D; whence, as the ſine of the angle A D B, the complement of the latitude, is to the ſine of A B, half the depreſſion, ſo is radius to the ſine of A D, half the time of the duration of the leaſt twilight poſſible. Now put $a =$ tangent of the angle A D B, $b =$ that of A B, and r for radius; then per ſpherics $a : b : r : \frac{br}{a} =$ B D. And in the triangle B D *y* it will be, as the ſine of B *y* D, the obliquity of the ecliptic, $= d$, is to the ſine of B D $= \frac{br}{a}$, ſo is the ſine of *y* D B $= e$, to the ſine of B *y* $= \frac{bre}{ad}$. Put f for the ſine of the latitude, then $\frac{e}{a} = \frac{f}{r}$, and hence B *y* $= \frac{bre}{ad}$ becomes $\frac{bf}{d}$; conſequently, in order to obtain B *y*, or the diſtance of the ſun from the next equinoctial point, we have this theorem; $d : f :: b :$ B *y*; that is, in words, As the ſine of the obliquity of the ecliptic is to the ſine of the latitude of the propoſed place, ſo is the tangent of half the depreſſion to the ſine of the ſun's diſtance from the next or neareſt equinoctial point, at the time when the duration of the crepuſculum is the ſhorteſt poſſible.

Cor. Hence, As radius is to the tangent of 9 degrees, (half the ſun's depreſſion below the horizon) ſo is the ſine of the latitude to a fourth ſine; this will be the ſine of the ſun's ſouthern declination that day of the year the twilight is the ſhorteſt poſſible: ſo that if you take 0 8002875 from the logarithm of the ſine of the elevation of the pole, the remainder will be the logarithm of the ſine ſought.

CRESCENT, *Creſcens*, the new moon, which, as it begins to recede from the ſun, ſhews a little rim of light, terminating in points, called horns, that are ſtill increaſing, till it is in oppoſition to the ſun, at which time it is full moon, or quite round.

CRESCENT, in heraldry, a bearing in form of a new moon.

CRESCENT is alſo an order of knights, inſtituted by Renatus of Anjou, king of Sicily, about the year 1448, ſo called from the badge of this order, which was an enamelled creſcent of gold.

CRESCENT, a term among farriers. Thus a horſe is ſaid to have creſcents, when that part of the coffin bone which is moſt advanced falls down and preſſes the ſole outwards, and the middle of his hoof above ſhrinks, and becomes flat, by reaſon of the hollowneſs beneath it.

CRESS, or CRESSES, in botany, the Engliſh name of the naſturtium. See the article NASTURTIUM.

Indian CRESS, the Engliſh name of the cardamindum, or tropæolum of botaniſts. See the article TROPÆOLUM.

Sciatica-CRESS, the ſame with cardamine. See the article CARDAMINE.

Sciatica-CRESS is alſo a name given to the lepidium, or dittander. See LEPIDIUM.

Water, or *Winter*-CRESS, the ſame with the ſiſymbrium. See SISYMBRIUM.

CREST, in armoury, the top part of the armour for the head, mounting over the helmet, in manner of a comb, or tuft of a cock, deriving its name from *criſta*, a cock's comb.

CREST, in heraldry, the uppermoſt part of an armoury, or that part of the caſk or helmet next to the mantle.

CREST, among carvers, an imagery, or carved work, to adorn the head, or top of any thing, like our modern corniche.

CREST-FALLEN, a fault of an horſe, when the upper part of his neck, called the creſt, hangs to one ſide: this they cure by placing it upright, clipping away the ſpare ſkin, and applying plaſters to keep it in a proper poſition.

CRETA, chalk, in natural hiſtory. See the article CHALK.

CREUX, a French term uſed among artiſts, and literally ſignifies a hollow cavity, or pit, out of which ſomething has been ſcooped or dug: whence it is uſed to ſignify that kind of ſculpture, where the lines and figures are cut and formed within the face or plan of the plate, or matter engraved; and thus it ſtands in oppoſition to relievo, where the lines and figures are emboſſed, and riſe prominent above the face of the matter engraved on.

CRIB, a frame of wood, wherein moiſt things, particularly ſalt, as it is taken out of the boiling-pan, are put to drain.

CRIBRATION, in pharmacy, the paſſing any ſubſtance through a ſieve, or ſearce, in order to ſeparate the finer particles from the groſſer, whether the body be dry and reduced to powder, or moiſt, as the pulps of ſeeds, fruits, or roots.

CRIBROSUM Os, in anatomy, called alſo os ethmoides, and os cribriforme, a bone ſituated internally in the fore part of the baſis of the ſkull. The uſes of it are to be a principal part of the organ of ſmelling, and to give a very great extent to the pituitary membrane in a ſmall compaſs.

CRIC, a machine, otherwiſe called a jack. See the article JACK.

CRICK, among farriers, is when a horſe cannot turn his neck any manner of way, but holds it ſore-right, inſo-

CRITHMUM, ſamphire, in botany, a genus of plants, the univerſal flower of which is uniform; the proper one conſiſts of five ovated, inflected, and nearly equal petals: there is no pericarpium: the fruit is oval, compreſſed, and ſeparable into two parts: there are two elliptical compreſſo-plane ſeeds, ſtriated on one ſide. Samphire is more uſed as a pickle, than for any medicinal purpoſes: however, it is ſuppoſed to ſtrengthen the ſtomach, provoke urine, and open obſtructions of the bowels.

CRITICAL Days and Symptoms, among phyſicians, are certain days and ſymptoms in the courſe of acute diſeaſes, which indicate the patient's ſtate, and determine him either to recover or grow worſe. A careful obſervation of theſe days is of the greateſt uſe towards the cure of diſeaſes, leſt miſchief be done by unſeaſonable aſſiſtance from art, as when a phyſician endeavours to expel that which is not prepared to be evacuated, or elſe hinder the evacuation of ſuch humours, as being ſubdued and concocted, endeavour to eſcape by ſome convenient outlet. According as the violence of the diſeaſe is more ſwift or ſlow, the critical days will be more or leſs diſtant from each other: thus in fevers which do not exceed the ſpace of three weeks, the quaternary or ſeptenary days are critical; and beſides theſe, there are in the two firſt weeks many more incidentally critical days, as the third, fifth, ſixth, &c. but if an acute diſeaſe extends itſelf beyond three weeks, then the quaternary days no more take place as critical, but only the ſeptennary days are ſo, though the efficacy of theſe laſt is likewiſe aboliſhed after the fortieth day. See the article Crisis.

CRITICISM, the art of judging with propriety concerning any diſcourſe or writing. Though the uſe of the word is ordinarily reſtrained to literary criticiſm, we may diſtinguiſh divers other branches of this art; as 1. Philoſophical criticiſm, the art of judging of the hypotheſes and opinions of philoſophers. 2. Theological criticiſm, the art of judging of explications of doctrines of faith. 3. Political criticiſm, the art of judging of the means of governing, acquiring, and preſerving ſtates. 4. Grammatical criticiſm, the art of interpreting the words of an author, &c. Lord Bacon divides criticiſm, firſt, as it regards the exact correcting and publiſhing of approved authors, by which the honour of ſuch authors is preſerved, and the neceſſary aſſiſtance afforded to the reader; yet the miſapplied labours and induſtry of ſome have in this reſpect proved highly prejudicial to learning; for many critics have a way, when they fall upon any thing they do not underſtand, of immediately ſuppoſing a fault in the copy; and hence it happens that the moſt corrected copies are often the leaſt corrected. 2. As it reſpects the explanation and illuſtration of authors by notes, comments, collections, &c. But here an ill cuſtom has prevailed, of ſkipping over the obſcure paſſages, and expatiating upon ſuch as are ſufficiently clear; as if the deſign was not ſo much to illuſtrate the author, as to take all occaſions of ſhewing their own learning and reading. It were therefore to be wiſhed, ſays the noble author, that every original writer who treats an obſcure ſubject, would add his own explanation to his work, and thus prevent any wrong interpretation by the notes of others. 3. There belongs to criticiſm a certain conciſe judgment or cenſure of authors publiſhed, and a compariſon of them with other writers who have treated the ſame ſubject: in ſhort, the art of criticiſm, though reckoned by ſome as a diſtinct part of philoſophy, is in truth nothing elſe than a more correct and accurate knowledge in the other parts of it; and a readineſs to apply that knowledge upon all occaſions, in order to judge well of what relates to theſe ſubjects, to explain what is obſcure in authors, to ſupply what is defective, and amend what is erroneous in manuſcripts or ancient copies, to correct the miſtakes of authors and errors in the ſenſe of the words, to reconcile the controverſies of the learned, and by theſe means to ſpread a juſter knowledge of the beautiful paſſages and ſolid reaſoning of authors, among the inquiſitive part of mankind.

CRIZZELING is ſaid of glaſs, which, by reaſon of too great a proportion of nitre, tartar, or borax, is ſcabrous or rough on the ſurface.

CROCHES, among hunters, the little buds growing about the tops of a deer or hart's horns.

CROCI, among botaniſts, the ſame with antheræ. See Antheræ.

CROCODILE, *Crocodilus*, in zoology, a ſpecies of lizard, with a two-edged tail and triangular feet, the fore ones having five, and the hinder only four toes.

This animal is the largeſt of the lizard kind, growing to twenty-five feet in length, and about the thickneſs of a man's body. It is a native of the torrid zone, frequenting ſalt-water rivers, where it lies concealed among the reeds or ruſhes, till it finds an opportunity to ſeize men or other animals, which it drags into the water, always taking this method of drowning them firſt, that it may afterwards devour them without reſiſtance: its general food, however, is fiſh. The Africans and Indians eat its fleſh, which is white, and of a kind of perfumed flavour.

CROCUS, ſaffron, in botany, a genus of plants, with narrow graſs-like leaves, which have a white line running along the middle: the ſtalk is ſhort and undivided, and bears on the top a purpliſh blue flower, deeply cut into ſix ſegments: in the middle of the flower ariſes, among the ſtamina, a whitiſh piſtil, divided at the top into three chives or fleſhy filaments, the lower part of which is ſlender and pale coloured, the upper broader, of a deep orange red, and very finely indented about the ſides: theſe filaments, carefully picked, and preſſed together into cakes, are the ſaffron of the ſhops. The plant is perennial, and flowers in autumn: the common ſpring crocuſes of our gardens are reckoned by Linnæus to be no other than varieties of it.

Saffron is cultivated in different parts of the world: that produced in England is greatly ſuperior to the ſorts brought from abroad, and may be diſtinguiſhed from them by its blades being broader. It ſhould be choſen freſh, not above a year old, in cloſe cakes, neither dry nor yet very moiſt, tough and firm in tearing, of a high fiery colour, and of the ſame colour within as on the outſide.

Saffron is a very elegant and uſeful aromatic; of a ſtrong, penetrating, diffuſive ſmell, and a warm, pungent, bitteriſh taſte. It is ſuppoſed to have a conſiderable degree of anodyne power, depending on its ſubtile odorous principle; to be more cordial and more exhilarating than almoſt any of the other aromatics, ſo as, when taken too freely, to occaſion even immoderate mirth; to be particularly ſerviceable in diſorders of the breaſt, in female obſtructions, and hyſteric depreſſions. It tinges the urine of a high colour. The doſe is commonly from two or three grains to ten or twelve: Geoffroy ſays it may be extended with ſafety to a ſcruple and more.

Saffron gives out the whole of its virtue and colour to rectified ſpirit, proof ſpirit, wine, vinegar, and water; about three parts in four of the ſaffron are taken up by each of theſe menſtrua; and the matter which remains undiſſolved is inodorous, inſipid, and of a pale clay colour. The officinal tinctures are made with ſack or French brandy, in the proportion of an ounce to a pint; by diſſolving in the vinous tincture a proper quantity of fine ſugar, twenty-five ounces to a pint, an elegant cordial ſyrup is obtained. Tinctures drawn with vinegar, or other liquors ſenſibly acid, ſoon loſe of their rich colour in keeping: the colour of the vinous tinctures alſo fades a little, and a part of the diſſolved ſaffron is apt to be in time thrown off: thoſe made in proof ſpirit, and in rectified ſpirit, particularly the latter, may be kept in perfection for years.

Crocus, in chemiſtry, denotes any metal calcined to a red or deep yellow colour: thus we meet with crocus martis aperiens and aſtringens, or the aperient and aſtringent crocuſes of iron; alſo with the crocus veneris, or copper calcined to ſuch a reddiſh powder.

Crocus Metallorum, an emetic preparation of antimony and nitre, thus made: Take an equal quantity of each, powder them ſeparately, then mixing them well together, throw the mixture by degrees into a red-hot crucible, where it is to remain till melted thoroughly; this, after being ſeparated from the ſcoriæ, is to be kept for uſe. By boiling this crude crocus, firſt reduced to a fine powder, in water, and afterwards waſhing it with more

Fig. 1. ANTIENT CROWNS.

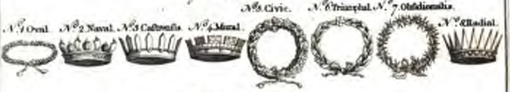

No. 1 Oval.
No. 2 Naval.
No. 3 Castrensis.
No. 4 Mural.
No. 5 Civic.
No. 6 Triumphal.
No. 7. Obsidionalis.
No. 8 Radial.

Fig. 2. ROYAL CROWNS.

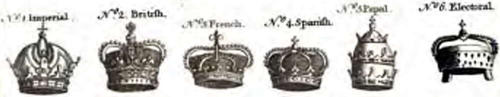
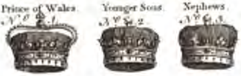

No. 1 Imperial.
No. 2. British.
No. 3 French.
No. 4. Spanish.
No. 5 Papal.
No. 6. Electoral.

Fig. 3.
CROWNS of the Blood Royal of Great Britain.


Prince of Wales.
No. 1.
Younger Sons.
No. 2.
Nephews.
No. 3.

Cupping *Fig. 5.*

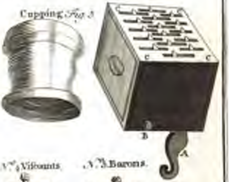
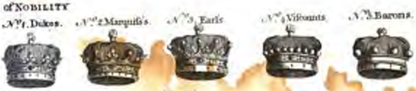


Fig. 4.
CROWNS
of NOBILITY


No. 1. Dukes.
No. 2 Marquis's.
No. 3. Earls.
No. 4 Viscounts.
No. 5. Barons.

Currents

Fig. 7.

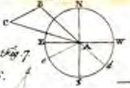
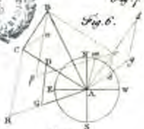


Fig. 6.


B
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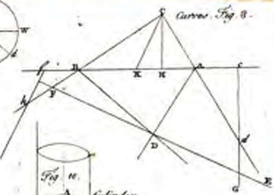
Currents

Curves. Fig. 8.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d
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E

Cycloid

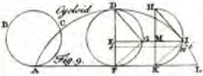
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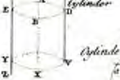
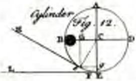
Fig. 9.

Fig. 10. *Cylinder*



Cylinder *Fig. 12.*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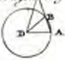
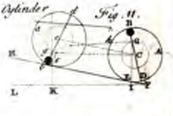
Dragon *Fig. 13.*



Cylinder *Fig. 11.*


d
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D
I
F
L
K

hot water, till it comes off inſipid, is obtained the waſhed crocus of antimony.

CROE, or CROME, an iron bar with a flat end: alſo a notch in the ſide-boards of a caſk, where the head-pieces come in.

CROFT, a little cloſe adjoining to a dwelling houſe, and encloſed for paſture or arable land, or any other particular uſe.

CROISADE, CRUSADE, or CRUZADO, a name given to the expeditions of the Chriſtians againſt the infidels, for the conqueſt of Paleſtine; ſo called becauſe thoſe who engaged in the undertaking wore a croſs on their cloaths, and bore one on their ſtandard.

CROISIERS, *Crucigeri*, croſs-bearers, a religious order founded in honour of the invention or diſcovery of the croſs, by the empreſs Helena.

CROISSANTE, in heraldry, is ſaid of a croſs, the ends of which are faſhioned like a creſcent or half moon. See CROSS.

CROSETTES, in architecture, the returns in the corners of chambranles, or door caſes, or window frames, called alſo ears, elbows, aniones, &c.

CROSIER, or CROZIER, a ſhepherd's crook; a ſymbol of paſtoral authority, conſiſting of a gold or ſilver ſtaff, crooked at the top, carried occaſionally before biſhops and abbots, and held in the hand when they give the ſolemn benedictions. The cuſtom of bearing a paſtoral ſtaff before biſhops is very ancient. Regular abbots are allowed to officiate with a mitre and croſier. Among the Greeks none but a patriarch had a right to the croſier.

CROSIER, in aſtronomy, four ſtars in the ſouthern hemiſphere, in the form of a croſs, ſerving thoſe who ſail in ſouth latitudes to find the antarctic pole.

CROSLET, in heraldry, is when a croſs is croſſed again at a ſmall diſtance from each of the ends. Upton ſays it is not ſo often borne by itſelf in arms, as other croſſes are, but often in diminutives, that is, in ſmall croſlets ſcattered about the field.

CROSS, *Crux*, in antiquity, a ſpecies of puniſhment, or rather the inſtrument wherewith it was inflicted, conſiſting of two pieces of wood croſſing each other.

CROSS, in heraldry, is defined by Guillim, an ordinary compoſed of four-fold lines, whereof two are perpendicular, and the other two tranſverſe; for ſo we muſt conceive of them, though they are not drawn throughout, but meet, by couples, in four right angles, near about the feſſe-point of the eſcutcheon. The contents of a croſs is not always the ſame; for when it is not charged, it has only the fifth part of the field; but if it be charged, then it muſt contain the third part thereof.

CROSS, in ſurveying, an inſtrument conſiſting of a braſs circle, divided into four equal parts, by two lines interſecting each other at the center; at the extremity of each line there is a ſight fixed, ſtanding perpendicularly over the line, with holes below each ſlit, for the better diſcovery of diſtant objects.

This inſtrument is mounted on a ſtaff, and is but little known, and leſs uſed among us, though abroad it is often uſed in ſurveying.

CROSS-JACK, in naval affairs, a ſail extended on the lower-yard of the mizen-maſt, called hence the croſs-jack yard. This ſail, however, is very ſeldom uſed.

CROSS-PIECE, in naval affairs, a piece of wood extended over the windlaſs in merchant ſhips to faſten ropes to: the two ends of it are let into the knight-heads. See KNIGHT-HEADS.

CROSS-STAFF, the ſame with fore-ſtaff. See the article FORE-STAFF.

CROSS-TREES, certain pieces of timber laid a-croſs the heads of the lower-maſts to make a frame for the top to reſt on. The uſe of the top is to extend the ſhrouds of the top-maſts, that they may ſupport it the better.

CROSSELET, a little or diminutive croſs, uſed in heraldry, where the ſhield is frequently ſeen covered with croſſelets; alſo feſſes and other honourable ordinaries, charged or accompanied with croſſelets. Croſſes frequently terminate in croſſelets.

CROTAPHITES, in anatomy, a muſcle of the lower jaw, ſerving to draw it upwards. Its fibres ſpring from the bones of the forehead, the ſinciput, ſphenoides, and temporale, which meeting, and as it were entering under the os jugale, whence alſo this muſcle receives ſome fibres, proceed to the proceſſus corone, into which they are inſerted.

CROTCHES, in naval architecture, certain crooked timbers in the after-hold, on which to form the narrower parts of a ſhip as ſhe approaches to the ſtern.

CROTCHES are alſo certain crooked pieces of wood or iron, fixed in different places of the ſhip to ſupport the ſpare maſts, &c.

CROTCHET, in muſic, one of the notes or characters of time, marked thus ♩, equal to half a minim, and double of a quaver. See the articles CHARACTER, MINIM, and QUAVER.

A dot added to the crotchet, thus ♩·, increaſes its time by one half, that is, makes it equal to a crotchet and a half.

CROTCHET, in printing, a ſort of ſtraight or curved line, always turned up at each extreme; ſerving to link ſuch articles as are to be read together; and uſed in analytical tables, &c. for facilitating the diviſions and ſubdiviſions of any ſubject.

CROTCHETS are alſo marks or characters, ſerving to incloſe a word or ſentence, which is diſtinguiſhed from the reſt, being generally in this form [ ] or this ( ).

CROUP *of a Horſe*, in the manege, the extremity of the reins above the hips.

CROUPADE, in the manege, a leap, in which the horſe pulls up his hind legs, as if he drew them up to his belly. Croupades differ from caprioles and balotades, in this, that in croupades the horſe does not jerk, as he does in the other two airs.

CROW, or CARRION-CROW, in ornithology, the Engliſh name of a ſpecies of corvus, about the ſize of the largeſt tame pigeon, and all over of a fine deep black colour, with large eyes and reflex briſtles at the noſtrils.

Royſton CROW, the Engliſh name of another ſpecies of corvus, with the body grey, the head, throat, wings, and tail, black.

CROW, in mechanics, a kind of iron lever with a claw at one end, and a ſharp point at the other; uſed for heaving or purchaſing great weights.

CROW'S BILL, among ſurgeons, a kind of forceps for drawing bullets and other foreign bodies out of wounds.

CROW'S FEET, in the military art, machines of iron, having four points, each about three or four inches long, ſo made that whatever way they fall, there is ſtill a point up: they are thrown upon breaches or in paſſes where the enemy's cavalry are to march, proving very troubleſome by running into the horſe's feet and laming them.

CROW-FOOT, in naval affairs, a certain complication of ropes that ſpread outward from a block to hang the awnings by, or keep the top-ſails from getting againſt the edges of the tops.

CROW'S FOOT, the Engliſh name of the ranunculus. See the article RANUNCULUS.

CROW-STAVES, the two upright pieces inſerted into the box of a plough, and bored with a number of holes, by means of which they ſupport a tranſverſe piece, called the pillow of the plough. See the articles PLOUGH and PILLOW.

CROWN, an ornament worn on the head by kings, ſovereign princes, and noblemen, as a mark of their dignity.

The Roman emperors had four kinds of crowns, ſtill ſeen on medals, viz. a crown of laurel, a radial or radiating crown, a crown adorned with pearls and precious ſtones, and the fourth a kind of bonnet or cap, ſomething like the mortier.

The Romans had alſo various kinds of crowns, which they diſtributed as rewards of military atchievements; as, 1. The oval crown, made of myrtle, and beſtowed upon generals who were entitled to the honours of the leſſer triumph, called ovation. See the article OVATION. 2. The naval or roſtral crown, compoſed of a circle of gold, with ornaments repreſenting beaks of ſhips, and given to the captain who firſt grappled, or the ſoldier who firſt boarded, an enemy's ſhip. Lipſius believes the corona navalis and roſtrata, to have been two diſtinct ſpecies, but they are generally thought to have been the ſame. 3. The crown, called in Latin, vallaris, or caſtrenſis,

trenſis, a circle of gold raiſed with jewels or paliſades; the reward of him who firſt forced the enemy's intrenchments. 4. The mural crown, a circle of gold indented and embatteled; given to him who firſt mounted the wall of a beſieged place, and there lodged a ſtandard. 5. The civic crown, made of the branch of a green oak, and given to him who had ſaved the life of a citizen. 6. The triumphal crown, conſiſting at firſt of wreaths of laurel, but afterwards made of gold; proper to ſuch generals as had the honour of a triumph. 7. The crown called obſidionalis, or graminea, made of graſs growing on the place; the reward of a general who had delivered a Roman army from a ſiege. 8. The crown of laurel, given by the Greeks to their athletæ; and by the Romans to thoſe who had negociated or confirmed a peace with an enemy: this was the leaſt honourable of all. We meet alſo with the corona aurea, often beſtowed on ſoldiers, without any other additional term; the radial crown, given to princes at their tranſlation among the gods; athletic crowns, and crowns of laurel, deſtined to crown victors at the public games, poets, orators, &c. All theſe crowns were marks of nobility to the wearers; and upon competitions with rivals for rank and dignities, often determined the preference in their favour. See plate XLVII. *fig.* 1.

Crown, in heraldry, is uſed for the repreſentation of that ornament, in the mantling of an armory, to expreſs the dignity of perſons.

The Imperial Crown is a bonnet or tiara, with a ſemicircle of gold, ſupporting a globe with a croſs at top. See plate XLVII. *fig.* 2. N°. 1.

The Britiſh Crown is adorned with four croſſes, between which there are four fleurs de lis: it is covered with four diadems, which meet at a little globe ſupporting a croſs. See *fig.* 2. N°. 2.

The French Crown is a circle of eight fleurs de lis, encompaſſed with ſix diadems, bearing at top a double fleur de lis, which is the creſt of France. See *fig.* 2. N°. 3.

The Spaniſh Crown is adorned with large indented leaves, and covered with diadems terminating in a globe, ſurmounted with a croſs. See *fig.* 2. N°. 4.

The crowns of almoſt all other kings are adorned with large leaves, bordered with four, ſix, or eight diadems, and with a globe and croſs at top.

The Papal Crown is compoſed of a tiara and a triple crown encompaſſing it, with two pendants like the biſhop's mitres. Theſe crowns repreſent the pretended triple capacity of the pope, as high prieſt, ſupreme judge, and ſole legiſlator of Chriſtians. See *fig.* 2. N°. 5.

An Electoral Crown, or coronet, is a ſcarlet cap turned up with ermine, and cloſed with a ſemicircle of gold, all covered with pearls, with a globe at top, ſurmounted with a golden croſs. See *fig.* 2. N°. 6.

Crowns *of the Britiſh Princes of the Blood*. 1. The prince of Wales's crown conſiſts alternately of croſſes and fleurs de lis, with one arch, in the middle of which is a ball and croſs, as in the royal diadem. 2. That of all the younger ſons and brothers of the king, conſiſts likewiſe of croſſes and fleurs de lis alternately, but without any arch, or being ſurmounted with a globe and croſs at top. 3. That of the other princes of the blood conſiſts alternately of croſſes and leaves like thoſe in the coronet of dukes, &c. See *fig.* 3.

Crowns *of Noblemen* are a duke's, compoſed of leaves of ſmallage, or parſley: that of a marquis, of flowers and pearls placed alternately: an earl has no flowers about the circle, like the duke and marquis, but only points riſing, and a pearl on every one of them: a viſcount has neither flowers nor points raiſed above the circle, like the other ſuperior degrees, but only pearls placed on the circle itſelf without any limited number: a baron has only ſix pearls on the golden border, not raiſed, to diſtinguiſh him from the earls; and the number of them limited, to ſhew he is inferior to the viſcount. See *fig.* 4.

Crown, in commerce, a general name for coins both foreign and domeſtic, which are of, or very near, the value of five ſhillings ſterling. See Coin.

Crown, in architecture, denotes the uppermoſt member of the corniche, called alſo corona, and larmier. See the articles Corona and Larmier.

Crown, in aſtronomy, a name given to two conſtellations, the one called borealis, the other meridionalis. See the article Corona.

Crown, in geometry, is a plane ring included between two concentric perimeters, and is generated by the motion of ſome part of a right line round a center, the ſaid moving part not being contiguous to the center.

The area of a crown will be had by multiplying its breadth by the length of the middle periphery; for a ſeries of terms in arithmetic progreſſion being $n \times \frac{a+w}{2}$, that is, the ſum of the firſt and laſt multiplied by half the number of terms, the middle element muſt be $\frac{a+w}{2}$; wherefore that multiplied by the breadth, or ſum of all the two terms, will give the crown.

Crown *of Colours*, certain coloured rings which like halos appear about the body of the ſun or moon, but of the colours of the rain-bow, and at a leſs diſtance than the common halos. Theſe crowns Sir Iſaac Newton ſhews to be made by the ſun's ſhining in a fine day, or the moon in a clear night, through a thin cloud of globules of water or hail, all of the ſame bigneſs. And according as the globules are bigger or leſſer, the diameters of theſe crowns will be larger or ſmaller; and the more equal theſe globules are to one another, the more crowns of colours will appear, and the colours will be the more lively.

Crown Office, an office that belongs to the King's bench-court, of which the king's coroner or attorney is commonly maſter. In this office, the attorney-general and clerk of the crown ſeverally exhibit informations for crimes and miſdemeanors at common law, as in the caſe of batteries, conſpiracies, libelling, &c. on which the offender is liable to pay a fine to the king.

Crown-Glass denotes the fineſt ſort of window-glaſs. See the article Glass.

Crown-Post, in architecture, a poſt which in ſome buildings ſtands upright in the middle between two principal rafters, and from it there go ſtruts or braces to the middle of each rafter. It is ſometimes called a king's piece, or joggle piece.

Crown-Wheel *of a Watch*, the upper wheel next the ballance, which by its motion drives the ballance, and in royal pendulums is called the ſwing-wheel.

Crown-Work, in fortification, an out-work having a very large gorge, generally the length of the curtin of the place, and two long ſides terminating towards the field in two demi-baſtions, each of which is joined by a particular curtin to a whole baſtion, which is the head of the work. The crown-work is intended to incloſe a riſing ground, or to cover the head of a retrenchment.

CROWNING, in architecture, is underſtood of any thing that finiſhes a decoration. Thus a corniche, a pediment, acroteria, are called crownings.

Crowning, in naval affairs, the finiſhing part of a knot made by the ends of the different ſtrands of a rope, being artfully intertwiſted amongſt each other to keep the end faſt in ſome place aſſigned for it.

CRUCIBLE, a chemical veſſel made of earth, and ſo tempered and baked as to endure the greateſt heat. They are uſed to melt metals, and to flux minerals, ores, &c.

The figure of a crucible is commonly that of an obtuſe conoid, with its baſe at the top, and obtuſe apex at the bottom; whence this conical figure may be varied, till it comes to the hollow ſegment of a ſphere. It is a rule that the lower and wider they are made, the more eaſily the volatile matter flies from the fixed, and that the fire is applied to more of the ſurface, both of the whole ſubject and its fixed part. See plate XXXIX. *fig.* 12.

CRUCIFIX, a croſs upon which the body of Chriſt is faſtened in effigy, uſed by the Roman catholics to excite in their minds a ſtrong idea of our Saviour's paſſion.

CRUCIFORM, in general, ſomething diſpoſed croſswiſe; but more eſpecially uſed by botaniſts, for flowers conſiſting of four petals diſpoſed in the form of a croſs: ſuch are the flowers of cabbage, rocket, wall-flower, &c. See Flower.

From this ſtructure of the flower, Tournefort has denominated

nominated one of his claſſes of plants *cruciformes*; com
prehending all plants with cruciform flowers, called b
Linnæus tetradynamia.

CRUCIS Experimentum. See the article Expi
rimentum Crucis.

CRUDE, an epithet given to ſomething that has no
paſſed the fire, or had a proper degree of coction.

CRUDITY, among phyſicians, is applied to undi
geſted ſubſtances in the ſtomach; to humours in the bod
which are unconcocted, and not prepared for expulſion
and to the excrements. There are two remarkable cru
dities in the ſtomach, the acid and nidoroſe. The firſt
when the aliments turn into a fixed acid liquamen mor
or leſs viſcid, being not ſufficiently attenuated and vol
tilized, which is the origin of chronical diſeaſes. A
acid crudity diſcovers itſelf by the heart-burn, by aci
eructations in abundance, and by coſtiveneſs. It is cor
rected by abſorbent and alcaline medicines, by volati
aromatics, &c. after which cathartics may be given; fo
if this method be not obſerved, purging medicines wi
not make their proper evacuations, but only cauſe grip
ings and ſpaſms in the bowels. A nidoroſe crudity
when the aliments are ſo far corrupted, that they ar
turned into a putrilaginous liquamen of a very unſavor
taſte and ſmell, which is called a nidor. It is attende
with fetid eructations ſomething like the ſmell of frie
eggs, or ſtinking fiſh; and very often with the hear
burn, and a ſort of nauſea riſing into the mouth from th
ſtomach. With relation to the cure, an emetic ſhould b
given, or at leaſt the body gently purged with rhubar
and tamarinds, after which acidulated juleps are good.

The crudity of the humours or morbific matter in
diſeaſe, is diſcovered chiefly from a fault in the quanti
or quality of the circulating as well as the ſecrete
humours, as of ſweat, mucus, ſaliva, urine, pus, bloo
&c.

CRUOR, among anatomiſts, ſometimes ſignifies th
blood in general; ſometimes only the venous blood; ar
ſometimes extravaſated, or coagulated blood.

CRUPPER, in the manege, the buttocks of a horſ
the rump; alſo a thong of leather put under a horſe
tail, and drawn up by thongs to the buckle behind th
ſaddle, ſo as to keep him from caſting the ſaddle fo
wards on his neck.

CRURA Clitoridis, in anatomy, two legs of th
clitoris, which run from the oſſa pubis, and are thre
times as long as the clitoris in its natural ſtate. See th
article Clitoris.

Crura Medullæ Oblongatæ, the two large
legs or roots of the medulla oblongata, which procee
from the cerebrum.

CRURÆUS, or Crureus Musculus, in anatom
a fleſhy maſs, covering almoſt all the foreſide of the
femoris, between the two vaſti, which likewiſe cover th
edges of this muſcle on each ſide. It is fixed to the for
ſide of the os femoris, from the anterior ſurface of th
great trochanter, down to the loweſt quarter of the bon
by fibres which run down ſucceſſively over each othe
between the two vaſti, and are partly united to theſe tw
muſcles, ſo that they do not ſeem to form a diſtinct mu
cle.

CRURAL, in anatomy, an epithet given to the arte
which conveys the blood to the crura, or legs, and to th
vein by which this blood returns towards the heart. Th
crural artery ſprings from the external branch of the ili
artery, upon which it lies, and is divided into two part
the external and internal: the external is ſmaller, and
diſtributed throughout the exterior part of the thigh; th
internal is larger, and forms the popliteæ, the ſurale
and the tibial arteries, and is afterwards, from the extre
mities of theſe, divided into a multitude of branches,
which anatomiſts have given no name, in the foot. Th
crural vein, which runs to the feet, and the intern
branch of which, towards the internal malleolus, is calle
the ſaphæna; and its external about the knee, poplitæa
in the intermediate part of the leg is called ſuralis; an
about the great toe of each foot, the cephalic vein of th
foot.

CRUS, in anatomy, all that part of the body contain
ed between the buttocks and the toes; it is divided in
the thigh, leg, and foot, See Thigh, Leg, and Foo

CRYSTALLI, among phyſicians, eruptions about the ſize of a lupin, white and tranſparent, which ſometimes break out all over the body.

CRYSTALLINE, in general, ſomething compoſed of, or reſembling cryſtal. See the article Crystal.

Crystalline Heavens, in ancient aſtronomy, two ſpheres, imagined between the primum mobile and the firmament, in the Ptolemaic ſyſtem, which ſuppoſes the heavens ſolid, and only ſuſceptible of a ſingle motion. See the article Ptolemaic System.

Crystalline Humour, in anatomy, a thick, compact humour, in form of a flattiſh convex lens, ſituated in the middle of the eye, ſerving to make that refraction of the rays of light, neceſſary to make them meet in the retina, and form an image thereon, whereby viſion may be performed.

It is included by the aſſiſtance of an extremely fine tunic in the fovea of the vitreous humour, and is ſuſpended by means of the ciliar ligament, between the aqueous and vitreous humour, immediately behind the pupil; in this place it hangs free, and is moveable by means of the ligament juſt mentioned. It is compoſed of a multitude of lamellæ, like the coats of an onion; and therefore alſo pellucid and vaſculous. There is alſo a ſmall quantity of the aqueous humour contained within or under its coat. See the article Eye.

CRYSTALLIZATION, in chemiſtry, the reducing ſalts to their proper ſpecific or cryſtalline form; ſo called from their reſembling cryſtals.

In order to underſtand this definition, it is neceſſary previouſly to know, that it is a property of all kinds of ſalts, when diſſolved in ſuch a quantity of water as is not ſufficient to keep them in that ſtate, and prevent their coaleſcence, to form themſelves into ſimilar figures of a peculiar kind, each according to its ſpecies; and theſe having, in ſeveral inſtances, the exact reſemblance of cryſtals, gave occaſion to their borrowing that name.

Saturation is effected by the difference of the quantities of ſalts which hot and cold water will diſſolve.

The intentional end of cryſtallization is to render the ſalts pure and diſtinguiſhable, as well by freeing them from feculencies, and giving them their proper form, as by ſeparating each kind from every other with which it may happen to be mixed. This it effectuates completely, if well executed; and it is attended with this particular advantage, that in this ſtate the ſpecies of any ſalt may certainly be diſtinguiſhed, in general, by the appearance only.

The manner of performing it is, to make a ſaturate ſolution of the ſalts in boiling water, either by adding the ſalts, if dry, to the water; or by evaporating the redundant water, if they were before diſſolved, and then putting the ſolution into a proper veſſel, and ſuffering it to reſt in a cool place till the cryſtals are formed. This is perfected in a longer or ſhorter time, according to the degree of heat or cold of the weather. It is, nevertheleſs, always beſt not to be too haſty in taking out the cryſtals; for there will be ſome continuance of their increaſe for a conſiderable length of time; and the quantity, therefore, obtained by each operation proportionably greater. When the full quantity of cryſtals is formed, the remaining ſolution, called, in this caſe, the mothers, is to be poured off, and what the cryſtals retain muſt be drained from them; which may be beſt done by putting them into an earthen calendar, on a ſheet of filtering paper. After they are thus freed from all the fluid which will drain from them, they muſt be ſpread on a clean board or table to dry; but great care muſt be taken that no duſt or ſulphureous ſteam be ſuffered to approach them: for the ſlighteſt circumſtance of that kind will deprave their colour; on which; though not their efficacy, their commercial value greatly depends.

In refining ſalt-petre, which is done by cryſtallization, where the quantity is great, large iron or copper plates, placed obliquely over a gentle fire, are made uſe of to dry the ſalts with more expedition; but the quantities demanded for the purpoſes of pharmacy may, with little trouble, be diſpatched by the common method.

The cryſtals being thus taken from the mothers, they may be again evaporated, or dry ſalts may be added to them, whilſt boiling, till a ſaturation of the hot ſolution is again produced; and on their being treated as before, a ſecond quantity of cryſtals will be obtained. By the ſame method repeated, nearly the whole quantity of ſalts may be converted into cryſtals; and the ſmall remainder may be either kept to be added to ſome future quantity, or the ſalts recovered in a dry ſtate by evaporation.

This is all that is neceſſary when the ſalts are pure; but if they are mixed with any heterogeneous matter, or feculencies, it is requiſite, that, before the ſolution is ſet to ſhoot, filtration ſhould be uſed.

When it is neceſſary to filter nitre, ſal ammoniac, and ſuch other ſalts as water will diſſolve in a large proportion, it is proper that the quantity of ſalts ſhould be conſiderably leſs than the whole of what the boiling water could diſſolve: for if the ſolution be then ſaturate, the ſalts are apt, as it cools in the filter, to ſhoot there, and choak it in ſuch a manner as is extremely troubleſome; which is entirely avoided when the quantity of water is increaſed to the proper degree.

In cryſtallizing larger quantities of ſalts, ſticks are uſually put croſs the veſſel, on which the ſalts forming are taken out in a more perfect figure, and leſs trouble, than when they adhere in thicker concretions to the ſides and bottom of the veſſels.

There is no particular form neceſſary for the veſſels which are employed in cryſtallization, provided they be ſuch that the cryſtals may be commodiouſly taken out. But it is very proper to have regard to the ſubſtance of which they are made, as well in reſpect of thoſe uſed for the ſolution, as thoſe for the cryſtallization; otherwiſe a corroſion of the veſſel, and conſequent depravation of the ſalts, or an unneceſſary waſte thereof, will frequently happen. For Glauber's ſalts, vitriolate tartar, ſea-ſalt, nitre, and green vitriol, provided they contain no redundant acid, iron may be uſed for their ſolution; but the cryſtallization ſhould be made in glaſs receivers, with wide necks, wood being liable to give the ſalts a brown hue: ſal ammoniac, regenerate tartar, and the ſalts of metals, alſo require to be diſſolved in glaſs. Copper veſſels ſhould be always rejected; but earthen ones may, in default of others, be uſed for both purpoſes, eſpecially where the coſt of the ſalt is inconſiderable; though a waſte always follows their uſe in conſequence of their imbibing the ſolution, and ſuffering an exhalation of it on their external ſurface, where ſalts are found in a quantity proportional to the heat, or the time which the ſolution is ſuffered to ſtand in the veſſel.

CRYSTALLOIDES, the cryſtalline tunic of the eye; a fine membrane containing the cryſtalline humour.

CUB, a bear's whelp. Among hunters, a fox and marten of the firſt year, are called cubs.

CUBATURE *of a Solid*, in geometry, the meaſuring the ſpace contained in it; or finding the ſolid contents of it.

CUBE, in geometry, a ſolid body conſiſting of ſix equal ſquare ſides.

The ſolidity of any cube is found by multiplying the ſuperficial area of one of the ſides by the height.

Cube, or Cubic Number, in arithmetic, is that number which is produced by multiplying any number by itſelf, and then again the product by that number; as 27 is a cubic number, ſince 3 multiplying 3 produces 9; and again, 3 multiplying 9 produces 27.

The difference of two cube numbers, whoſe roots differ by unity, is equal to the aggregate of the ſquare of the root of the greater, double the ſquare of the leſs, and the leſs root.

Cube, or Cubic *Quantity*, in algebra, the third power in a ſeries of geometrical proportionals continued; as a is the root, aa the ſquare, and aaa the cube. All cubic numbers may be ranged into the form of cubes; as 8 or 27, whoſe ſides are 2 and 3, and their baſes 4 and 9; whence it appears, that every true cubic number, produced from a binomial root, conſiſts of theſe parts, viz. The cubes of the greater and leſſer parts of the root, and of three times the ſquare of the greater part multiplied by the leſſer, and of three times the ſquare of the leſſer multiplied by the greater, as,

$$\begin{array}{l} aa+2ab+bb \\ a+b \\ \hline aaa+2aab+abb \\ \qquad\quad aab+2abb+bbb \\ \hline aaa+3aab+3abb+bbb \end{array}$$

From hence it is eaſy to underſtand both the compoſition of any cubic number, and the reaſon of the method for extracting the cube root out of any member given. See the following article.

Cube-Root *of any Number, or Quantity*, is ſuch a number or quantity which, if multiplied into itſelf, and then again the product thence ariſing by that number or quantity, being the cube-root, this laſt product ſhall be equal to the number or quantity whereof it is the cube-root; as 2 is the cube-root of 8; becauſe two times 2 is 4, and two times 4 is 8; and $a+b$ is the cube-root of $a^3+3aab+3abb+b^3$.

CUBEBS, *Cubebæ*, dried berries, greatly reſembling pepper, but furniſhed each with a ſlender ſtalk, whence they are called by ſome, *piper caudatum.* They are the fruit of an Eaſt-Indian tree, of which we have no particular account, ſaid to reſemble the apple-tree, and to produce its berries in cluſters.

Cubebs are a warm ſpice, of a pleaſant ſmell, and a moderately pungent taſte. Their heat and pungency are weaker than thoſe of pepper, but of the ſame kind; and reſide, like thoſe of that ſpice, not in the volatile, but in the more fixed matter. In diſtillation with water, they yield a quantity of a ponderous eſſential oil, of an agreeable and moderately ſtrong ſmell, but in taſte mild: the remaining decoction, inſpiſſated to the conſiſtence of an extract, retains a conſiderable ſhare of the warmth and pungency of the cubebs. An extract made with rectified ſpirit, poſſeſſes the whole of their flavour in perfection; for even the odorous principle does not exhale or diſtil with this menſtruum: the taſte of this extract is very hot and pungent, though not near ſo much ſo as that of the ſpirituous extract of pepper.

CUBIC *Equation*, in algebra, is an equation whoſe higheſt power conſiſts of three dimenſions; as $x^3=a^3-b^3$, or $x^3+fx^2-abx=mmn+pqr$, &c. All cubic equations have three roots, either all real, or one real, and two impoſſible.

To ſhew the geneſis of a cubic equation, let $x=a$, $x=b$, $x=c$, then $x-a=0$, $x-b=0$ and $x-c=0$; by the continual multiplication of theſe reſiduals we ſhall have $x^3 \begin{array}{c}-a\\-b\\-c\end{array} x^2 + \begin{array}{c}ab\\ac\\bc\end{array} x - abc=0$. Put $a+b+c=m$, $ab+ac+bc=n$, and $abc=p$, then $x^3-mx^2+nx-p=0$; here, according as m, n, and p, are poſitive, or negative, the roots of the propoſed equation will be either real or imaginary.

The cubic equation $x^3-4x^2+7x-6=0$, has only one real root, which is 2, and two impoſſible ones, $1+\sqrt{-2}$ and $1-\sqrt{-2}$. But to find theſe impoſſible or imaginary roots, by having the real one given, divide $x^3-4x^2+7x-6=0$ by $x-2$, the quotient x^2-2x+3 muſt certainly be equal to nothing; whence we have $x^2-2x=-3$. By compleating the ſquare and proper reduction, x becomes $1+\sqrt{-2}$ or $1-\sqrt{-2}$. Now any of theſe, 2, $1+\sqrt{-2}$, $1-\sqrt{-2}$ being writ in the equation for x, will make all its terms deſtroy one another; but $1+\sqrt{-2}$, and $1-\sqrt{-2}$, are impoſſible numbers, becauſe they ſuppoſe the extraction of the ſquare root out of the negative number -2. In the ſame manner, if $x^3=a^3$, beſides x being equal to a, there are two other values thereof, viz. $a\times\overline{\frac{1}{2}+\sqrt{-\frac{3}{4}}}$, and $a\times\overline{\frac{1}{2}-\sqrt{-\frac{3}{4}}}$.

A general ſolution of Cubic Equations.—Let it be required to find the value of x in the equation $x^3+bx^2+cx=m$.

Put $r+e=x$, then $r^3+3r^2e+3re^2+e^3+br^2+2bre+be^2+cr+ce=m$, make $ee=\frac{d-3r^2e-2bre-ce}{3r+b}$, then $e^3=\frac{de-3r^2e^2-2bre^2-ce^2}{3r+b}$; therefore $r^3+3r^2e+3re^2+\frac{de-3r^2e^2-2bre^2-ce^2}{3r+b}+br^2+2bre+be^2+cr+ce=m$. Now put $d=m-r^3-br^2-cr$, $s=3r^2+2br+c$, $3r+b=n$; then our equation will become $\frac{s+\frac{d}{n}}{n+\frac{-s}{n}}\times e+e^2=\frac{d}{n+\frac{-s}{n}}$, or $\frac{ns+d}{n^2-s}\times e+e^2=\frac{nd}{n^2-s}$; from whence, by compleating the ſquare, &c. we get $e=\sqrt{\frac{nd}{n^2-s}+\frac{\overline{ns-d}^2}{\overline{\frac{n^2-s}{2}}^2}}-\frac{ns+d}{2n^2-2s}$. But if the ſecond power of e be rejected, then $e=\frac{nd}{ns+d}$.

Cubic *Hyperbola* is a figure defined by the equation $xy^2=a^3$, having two aſymptotes, and conſiſting of two hyperbolas lying in the adjoining angles of the aſymptotes, and not in the oppoſite angles, like the Apollonian hyperbola, being otherwiſe called by Sir Iſaac Newton, in his *Enumeratio Linearum Tertii Ordinis*, an hyperboliſmus of a parabola; and is the ſixty-fifth ſpecies of his lines, according to him.

Cubic *Parabola*. See Parabola.

CUBIT, in the menſuration of the ancients, a long meaſure, equal to the length of a man's arm, from the elbow to the tip of the fingers.

Dr. Arbuthnot makes the Engliſh cubit equal to eighteen inches; the Roman cubit equal to 1 foot, 5,406 inches; and the cubit of the Scripture equal to 1 foot, 9,888 inches.

CUBITÆUS, in anatomy, the name of two muſcles; the one called cubitæus externus, being the firſt of the extenſor muſcles of the fingers, ariſes from the external extuberance of the humerus, and paſſing its tendon under the ligamentum annulare, is inſerted into the fourth bone of the metacarpus that ſuſtains the little finger: the other is the cubitæus internus, which ariſeth from the internal extuberance of the humerus, and upper part of the ulna, upon which it runs all along, till it paſſes under the ligamentum annulare, and is inſerted, by a ſtrong and ſhort tendon, into the fourth of the firſt order of the carpus.

CUBITUS, in anatomy, a bone of the arm, reaching from the elbow to the wriſt, otherwiſe called the ulna. The cubitus, for the ſake of the more eaſy and varied motion, is compoſed of a binary number of bones, called the cubitus, or ulna, and the radius. The ſituation of the ulna is interior, its length is greater than that of the radius, and has a motion of flexion and extenſion.

CUBOIDES, or Os Cuboides, in anatomy, the ſeventh bone of the foot, ſo called from its reſembling a cube. It is ſituated in the external ſide of the tarſus, where it receives the outer bone of the metatarſus, and is articulated with the neighbouring bones.

CUCKOO, in ornitholoy, the Engliſh name of a well known bird, called by zoologiſts, cuculus. See Cuculus.

Cuckoo-Flower, in botany, a name ſometimes given a plant, more generally called cardamine, or lady's ſmock.

Cuckoo-Spit, the ſame with froth-ſpit. See the article Froth-Spit.

CUCULLARIS, in anatomy, a muſcle of the ſcapula, otherwiſe called trapezius: it ariſes from the os occipitis, the ſpinoſe apophyſes of the neck, and of the ſeventh and eighth of the back. Its termination is at the ſpine of the ſcapula. It has the power of ſeveral very different motions; the different courſe of its ſeveral fibres enabling it, as they act differently, to move the ſcapula upwards, downwards, or backwards.

CUCULUS, the cuckoo, in ornithology, a genus of birds, of the order of the picæ, the characters of which are theſe: the beak is ſmooth; the noſtrils are a little prominent; the tongue is entire, and ſagittated; the toes are four in number, two before and two behind.

The common cuckoo is a bird of conſiderable beauty, which breeds with us, but does not remain all the year.

Its head, neck, and back, are of a hoary colour, with ſome dark grey feathers; the wings are of a browniſh black, the throat of an undulated fleſh colour, and the belly whitiſh. The colour of the female differs but very little from that of the male.

CUCUMBER, *Cucumis*, in botany, a genus of plants, whoſe characters are the following:

It hath a flower conſiſting of one ſingle leaf, which is bell-ſhaped and expanded towards the top, and cut into many ſegments; of which ſome are male or barren, having no embryo, but only a large ſtyle in the middle, which is charged with the farina: others are female or fruitful, being faſtened to an embryo, which is afterwards changed into a fleſhy fruit, for the moſt part oblong and turbinated, which is divided into three or four cells incloſing many oblong ſeeds.

To raiſe cucumbers, you muſt provide in January a quantity of new horſe-dung, with the litter mixed together, in proportion to the number of plants you intend to raiſe, which, if for a private family, two loads will be full enough. This ſhould be thrown into an heap, mixing a few ſea coal aſhes therewith; in about four or five days after, the dung will begin to heat, at which time you may draw a little part of the heap on the outſide flat, laying thereon a little good earth, about two inches thick; this you ſhould cover with a bell-glaſs, laying a little dry litter thereon; and in a day or two after, when you perceive the earth to be warm, you muſt put your ſeeds therein, covering them about a quarter of an inch with the ſame earth; then put the glaſs on again: and alſo at night, or in bad weather, obſerve to cover the glaſs with dry litter or mats, &c. and in three or four days time, if the dung be in a good temper of heat, the plants will appear above-ground; which when you firſt obſerve, you muſt immediately with the adjoining heap of dung make a bed for one ſingle light, being careful not to take the dung away too cloſe to the bell-glaſs, but obſerving to lay a little dung round about it, as alſo to keep it covered, that the young plants may not receive a check thereby. This hot bed will require to be three feet thick in dung at leaſt, which, in the making, ſhould be carefully mixed, and beat pretty cloſe with the fork, to prevent the heat from being too ſudden and violent: then lay ſome freſh earth upon the dung, about three inches thick, levelling it very even; and put on the frame, covering it over in the night, or in bad weather, with a mat, &c. as before, in order to excite a heat in the bed; and as ſoon as you perceive the bed to be in a good condition of heat, you ſhould prick your young plants thereon, at about two inches diſtance each way, obſerving to put them into the earth almoſt up to their ſeed leaves.

If the bed is of a good temper of heat, your plants will take root in leſs than twenty-four hours; after which time you muſt be careful to let in a little air, at ſuch times when the weather will permit, as alſo to turn the glaſs upſide-down every day to dry. You muſt likewiſe be very cautious in giving water to the plants, while young, and whenever this is done, it ſhould be ſparingly, and the water ſhould be placed either in the heap of dung, or in ſome other warm place, for ſome time before it is uſed, ſo as to be nearly of a temperature for warmth with the incloſed air of the hot-bed; and, as the plants advance in height, you ſhould have a little dry ſifted earth always ready to earth up their ſhanks, which will greatly ſtrengthen them.

Theſe directions, if carefully attended to, will be ſufficient for raiſing the plants in the firſt bed: you muſt therefore, when you perceive the third or rough leaf begin to appear, prepare another heap of freſh dung, which ſhould be mixed with aſhes, as was before directed: this ſhould be in quantity according to the number of holes you intend to make. The common allowance for ridging out the earlieſt plants is, one load to each light or hole, ſo that the bed will be near three feet in dung; but for ſuch as are not ridged out till March, two loads of dung will be ſufficient for three holes; for there is not the leaſt advantage to be gained in making theſe beds ſo thick with dung as ſome perſons do: their crops are ſeldom better, if ſo good, as thoſe which are of a moderate ſubſtance; nor are they forwarder, and the fruit is rarely ſo fair; nor do the vines continue ſo long in health.

In four or five days time your bed will be in fit order to receive your plants; of which you may eaſily judge by pulling out one of the ſticks which was put in the middle of the holes, and feeling the lower part of it, which will ſatisfy you what condition your bed is in: then you muſt ſtir up the earth in the middle of the hole with your hand, and making as it were a kind of baſon. Into each of theſe holes you muſt plant four plants; in doing of which, obſerve to make the holes a little ſlanting towards the middle of the baſon, eſpecially if your plants are long ſhanked: this is intended to place the roots of the plants as far as poſſible from the dung; to which, if they approach too near, the lower part of their roots is ſubject to be burned off: then ſettle the earth gently to each plant, and, if the earth is dry, it will be proper to give them a little water, which ſhould be warmed to the temper of the bed, as was before directed; and, if the ſun ſhould appear in the middle of the day, they ſhould be ſhaded therefrom with mats until the plants have taken root, which will be in two or three days; after which, you muſt let them enjoy as much of the ſun as poſſible, obſerving to turn the light in the day time to dry, as alſo to give a little freſh air, whenever the weather will permit.

When your vines are ſpread, ſo as to cover the hot-bed, it will be of great ſervice, when you water them, to ſprinkle them all over gently, ſo as not to hurt the leaves; but obſerve to do this not at a time when the ſun is very hot. The watering of the beds all over will be of great ſervice, by giving nouriſhment to thoſe roots, which by this time will have extended themſelves all over the bed: and if the warmth of the bed ſhould now decline, it will be of great ſervice to add a lining of freſh dung round the ſides of the beds, to give a new heat to them: for, as the nights are often very cold at this ſeaſon, where the beds have not a kindly warmth left in them, the fruit will frequently drop off the vines, when grown to the ſize of the little finger: and if upon this lining of dung there is a thickneſs of ſtrong earth laid for the roots of the plants to run into, it will greatly ſtrengthen them, and continue the plants in vigour a much longer time than they otherwiſe will do; for the roots of theſe plants extend to a great diſtance when they have room, which they cannot have in a bed not more than five feet wide; ſo that, when they have no greater extent for their roots, the plants will not continue in vigour above five or ſix weeks, which, if they have a depth and extent of earth, will continue three months in bearing; ſo that, where there are ſeveral beds made near each other, it will be the beſt way to fill up the bottom of the alleys between them with warm dung, and cover that with a proper thickneſs of earth, ſo as to raiſe them to the level of the beds.

Wild Cucumber, *Cucumis*, a warty, hairy, ſomewhat oval fruit, not above two inches in length: the fruit, when ripe, burſts on being touched, and throws out with violence its whitiſh juice and its black ſeeds. It is ſown annually, as all the preceding, in gardens.

All the parts of the wild cucumber are ſtrongly purgative: the fruit appears to be ſomewhat more ſo than the root, and this than the leaves. The juice that iſſues ſpontaneouſly, or by the very light preſſure, on ſlitting the fruit when almoſt ripe, has an unpleaſant ſmell, and a very durable nauſeous bitter taſte: on ſtanding for a few hours, it parts into a thick matter, which ſettles to the bottom, and a thin watery fluid, which floats above; this laſt may be commodiouſly drained off, after the clearer part is decanted, by means of ſtripes of woollen cloth or ſkains of cotton laid over the ſides of the veſſel. The thick fecula, dried in the ſun or any other gentle heat, is a very ſtrong irritating, but ſlow cathartic; and often operates likewiſe upwards. It remarkably raiſes the pulſe, and ſeems to kindle a degree of fever for a time: its uſe therefore is in cold indolent phlegmatic caſes; particularly in dropſies, in which it has ſometimes been given with ſucceſs after medicines of a milder kind had proved ineffectual. Two or three grains are in general a ſufficient doſe: in ſome caſes this quantity has acted violently; in others, five grains have procured plentiful evacuation, without much uneaſineſs or diſturbance to the conſtitution.

CUCURBIT, in chemiſtry, an earthen or glaſs veſſel, ſo called from its reſemblance to a gourd, ariſing gradually from a wide bottom, and terminating in a narrow neck.

This inſtrument is of great uſe in chemical diſtillations, digeſtions, and ſublimations. The more the wideneſs of the bottom, at its largeſt part, ſurpaſſes the narrowneſs of the neck, and the narrower and longer the neck is, with the greater difficulty is the liquor in the cucurbit diſtilled. Upon theſe circumſtances depends the choice we ought to make of cucurbits.

Blind CUCURBIT is a ſmall inverted cucurbit, adapted to another in ſuch a manner, that the neck of the one is inſerted in that of the other. The veſſel called circulatory, is one of this kind.

CUCURBITA, the gourd, in botany, a genus of plants, the corolla of which is formed of a ſingle campanulated petal, divided into five ſegments. The fruit is apple-like, and contains three membranaceous cells: the ſeeds are numerous, compreſſed, tumid, obtuſe, and placed in two rows. See the article GOURD.

CUCURBITULA denotes a cupping-glaſs. See the article CUPPING.

CUD, ſometimes means the inſide of the throat in beaſts, and ſometimes the food that they keep there, and chew over again: from whence, to chew the cud ſignifies, to ponder, think, or ruminate upon a thing.

CUD LOST, implies cattle that ſometimes loſe their cud by chance, ſometimes by ſickneſs, poverty, mourning, &c. to cure which, take four leaven of rye bread, and ſalt, and mixing it with human urine and baum, beat it in a mortar; then making a large ball or two thereof, put them down the beaſt's throat.

CUE, among ſtage-players, an item, or inuendo, given to the actors on the ſtage, what, or when to ſpeak.

CUIRASSE, a piece of defenſive armour, made of plate, well hammered, ſerving to cover the body, from the neck to the girdle, both before and behind: whence

CUIRASSIERS, cavalry armed with cuiraſſes, as moſt of the Germans are: the French have a regiment of cuiraſſiers: but we have had none in the Engliſh army, ſince the Revolution.

CUL *de Lamp*, in architecture, a term uſed for ſeveral decorations, both of maſonry and joinery, found in vaults and ceilings, to finiſh the bottom of works; and wreathed ſomething in the manner of a teſtudo, particularly a kind of pendentive in Gothic vaults.

CUL *de Four*, a ſort of ſpherical vault, like an oven. See the article VAULT.

CUL *de Four of a Niche*, ſignifies the arched roof of a niche, on a circular plan.

CULDEES, in church hiſtory, a ſort of monkiſh prieſts, formerly inhabiting Scotland and Ireland. Being remarkable for the religious exerciſes of preaching and praying, they were called, by way of eminence, *Cultores Dei*; from whence is derived the word Culdees. They made choice of one of their own fraternity to be their ſpiritual head, who was afterwards called the Scotch biſhop.

CULLIAGE, a barbarous and immoral practice, whereby the lords of manors anciently aſſumed a right to the firſt night of their vaſſals brides.

CULM, among botaniſts, a term uſed to denote the ſtalk of graſſes, hence called culmiferous plants. See the next article.

CULMIFEROUS *Plants*, in botany, ſuch plants as have a ſmooth jointed ſtalk, uſually hollow, and at each joint, wrapped about with ſingle, narrow, ſharp-pointed leaves, and their ſeeds contained in chaffy-husks, as wheat, barley, &c.

CULMINATION, in aſtronomy, the paſſage of any heavenly body over the meridian, or its greateſt altitude for that day.

CULPRIT, a formal reply of a proper officer in court, in behalf of the king, after a criminal has pleaded not guilty, affirming him to be guilty, without which the iſſue to be tried is not joined. After an indictment, for any criminal matter, is read in court, the priſoner at the bar is aſked whether he is guilty, or not guilty, of the indictment? If he anſwers, not guilty, there is a replication by the clerk of the arraignments from the crown, by continuing the charge of the guilt upon him, which is expreſſed in the word culprit.

The term culprit is a contraction of the Latin *culpabilis*, and the French *priſt*; importing that he is ready to prove the criminal guilty.

CULVERIN, in the military art, a large cannon, or piece of artillery, for the kinds, weight, and proportion of which, ſee the article CANNON.

CULVERTAILED, among ſhip-wrights, ſignifies the faſtening, or letting, of one timber into another, ſo that they cannot ſlip out, as the carlings into the beams of a ſhip.

CUMMIN, *Cuminum*, an umbelliferous plant, reſembling fennel, but much ſmaller; producing longiſh, ſlender, plano-convex ſeeds, of a browniſh colour, with pale yellowiſh ſtriæ. It is annual; a native of Egypt and Ethiopia; and cultivated in the iſlands of Sicily and Malta, from whence we are ſupplied with the ſeeds.

Cummin ſeeds have a bitteriſh warm taſte, accompanied with an aromatic flavour, but not agreeable. They give out great part of their ſmell by infuſion in water, but very little of their taſte: in diſtillation with water, a pungent oil ariſes, of a ſtrong ungrateful flavour like that of the ſeeds: the decoction, inſpiſſated, leaves a weakly roughiſh bitteriſh extract. Rectified ſpirit takes up the whole virtues of the cummin by infuſion, and leaves them nearly uninjured in evaporation: the inſpiſſated maſs is very warm, moderately pungent, and not a little nauſeous.

Theſe ſeeds are accounted good carminatives and ſtomachics; but have now, in great meaſure, given place, for theſe purpoſes, to medicines of a more grateful kind. Their principal uſe is in external applications, as a warm diſcutient and antiſeptic.

CUNEIFORM, in general an appellation given to whatever reſembles a wedge.

The word is formed from the Latin *cuneus* a wedge, and *forma*, reſemblance.

CUNEIFORM-BONE, in anatomy, the ſeventh bone of the cranium, called alſo os baſilare, and os ſphenoides. See the article SPHENOIDES-OS.

CUNEIFORM-BONES, or OSSA CUNEIFORMIA, are alſo three bones of the foot, all different in their ſizes, and articulated with the os naviculare, and with the three bones of the metatarſus, viz. thoſe which ſupport the great toe, the ſecond, and the third. See the articles METATARSUS and NAVICULARE.

CUNETTE, or CUVETTE, in fortification, a deep trench, about three or four fathoms wide, ſunk along the middle of a dry moat, to make the paſſage more difficult to the enemy.

CUNEUS, the wedge, in mechanics. See the article WEDGE.

CUNEUS, in antiquity, a company of infantry, drawn up in form of a wedge, the better to break through the enemy's ranks.

CUNNING, amongſt ſeamen, the art of directing the ſteerſman to guide the ſhip in her proper courſe: the officer who has this charge is either the pilot, or a quarter-maſter.

CUP, a veſſel of capacity of various forms and materials, chiefly uſed to drink out of.

CUP, among botaniſts, the ſame with calyx. See the article CALYX.

CUPOLA, in architecture, a ſpherical vault; or the round top of the dome of a church, in form of a cup inverted. See the article DOME.

CUPPEL, or *Coppel*, in chemiſtry. See the article COPPEL.

CUPPING, in ſurgery, the operation of applying cupping-glaſſes for the diſcharge of blood, and other humours, by the ſkin.

The operation of cupping is not confined to any particular member of the body; but wherever the cupping-glaſs is applied, it is fixed upon the ſkin, either intire or ſcarified, and hence we have a twofold diſtinction of cupping, into dry and gorey.

In dry cupping, the glaſs adheres to the ſkin, by expelling or rarefying its included air by lighted flax, or the flame of a burning candle within it, ſo that the glaſs is preſſed upon the part with a conſiderable force, by the external air. The uſe of this dry-cupping is two-fold, either to make a revulſion of the blood, from ſome particular parts affected, or elſe to cauſe a derivation of it into the affected part, upon which the glaſs is applied: hence we have a reaſon why Hippocrates orders a large cupping-glaſs to be applied under the breaſts of a woman who has too profuſe a diſcharge of her menſes, intending thereby to make a revulſion of the blood upwards from the uterus Dry cupping is alſo uſed, with ſucceſs, to make a revulſion, by applying the glaſſes to the temples, behind the ears, or to the neck and ſhoulders, for the removal of pains, vertigoes, and other diſorders of the head: they are applied to the upper and lower limbs, to derive blood and ſpirits into them, when they are paralytic; and, laſtly, to remove the ſciatica, and other pains of the joints. The operation in theſe caſes is to be repeated upon the part, till it looks very red, and becomes painful.

In Germany, and other northern countries, cupping is much oftener joined with ſcarification, than uſed alone; in which caſe the part is firſt to be cupped, till it ſwells and looks red, and the ſkin is to be punctured, or inciſed, by the ſcarifying inſtrument.

As ſeveral glaſſes, ſometimes ſix or eight, are often applied at once, the operator muſt manage his buſineſs ſo, that ſome glaſſes may be filling while he is ſcarifying, and adapting the others. When the blood ceaſes to flow faſt enough, he muſt repeat his inciſions, cloſe by the former, and re-apply the cupping-glaſſes. The operation being finiſhed, and the ſkin well cleanſed with a ſponge, and warm water, it is next to be rubbed over with a bit of deer's ſuet, to promote the healing: but if the blood ſtill continues to flow, the ſkin is to be waſhed with ſpirit of wine and hungary water, binding it up with a compreſs and bandage

The cupping-glaſs and inſtrument are repreſented in plate XLVII. *fig.* 5.

This inſtrument conſiſts of a braſs box, on one of whoſe ſides are a number of lancets moveable by a ſpring within the box. When this ſide is applied to the ſkin, the ſpring is to be raiſed by the handle A; and on depreſſing the button B, it cauſes the lancets to pierce the ſkin all at once.

CUPRESSUS, the cypreſs tree, one of the ever-greens, and very proper to mix with pines and firs in forming clumps.

The wood of the cypreſs is very valuable when grown to a ſize fit for planks, which it will do in as ſhort a ſpace as oaks; therefore, why ſhould not this be cultivated for that purpoſe, ſince there are many places in England where the ſoil is of a ſandy or gravelly nature, and ſeldom produces any thing worth cultivating? Now, in ſuch places theſe trees would thrive wonderfully, and greatly add to the pleaſure of the owner, while growing, and afterwards render as much profit to his ſucceſſors as perhaps the beſt plantation of oaks, eſpecially ſhould the timber prove as good here, as in the iſlands of the Archipelago, which there is no reaſon to doubt of: for we find it was ſo gainful a commodity to the iſland of Candia, that the plantations were called *Dos Filiæ*; the felling of one of them being reckoned a daughter's portion.

The timber of this tree is ſaid to reſiſt the worm, moth, and all putrefaction; and is ſaid to laſt many hundred years. The doors of St. Peter's church at Rome were framed of this material, which laſted from Conſtantine the Great to pope Eugenius the Fourth's time, which was eleven hundred years, and were then found and entire, when the pope would needs change them for gates of braſs. The coffins were made of this timber, in which, Thucydides tells us, the Athenians uſed to bury their heroes; and the mummy-cheſts, brought with thoſe condited bodies out of Egypt, are many of them of this wood.

This tree is by many learned authors recommended for the improvement of the air, and a ſpecific for the lungs, as ſending forth great quantities of aromatic and balſamic ſcents; wherefore many of the ancient phyſicians of the eaſtern countries uſed to ſend their patients who were troubled with weak lungs, to the iſland of Candia, which at that time abounded with theſe trees, where, from the effects of the air alone, very few failed of a perfect cure.

CUPRUM, or COPPER, in natural hiſtory. See COPPER.

CURATE properly ſignifies the parſon, or vicar of a pariſh, who has the charge, or cure, of the pariſhioners ſouls.

CURATE alſo implies a perſon ſubſtituted by the incumbent to ſerve his cure in his ſtead.

CURB, in the manege, a chain of iron, made faſt to the upper-part of the branches of the bridle, in a hole, called the eye, and running over the horſe's beard. It conſiſts of theſe three parts, the hook fixed to the eye of the branch; the chain of S S's or links; and the two rings or mailes.

CURB is alſo a hard and callous ſwelling, that runs along the inſide of a horſe's hoof, in the great ſinew behind, above the top of the horn, which makes him halt, and go lame, when he has been heated. It is to be cured by the like applications as are preſcribed in the ſpavin. See the article SPAVIN.

CURCUMA, turmeric, a ſmall tuberous knotty root, brought from the Eaſt-Indies; externally greyiſh, internally of a deep lively yellow or ſaffron colour, which by age changes more and more towards a red. It communicates to water its own deep yellow colour; but to rectified ſpirit of wine, a red. The ſpirituous tincture, applied upon warm marble, gives a durable red ſtain. Woollen cloth, impregnated with a ſolution of alum and tartar, acquires, on being boiled with the watery decoction, an elegant, but not very durable, orange yellow or gold coloured dye. It is rarely made uſe of by the dyers on account of its price and the periſhableneſs of its colour.

CURDLING, the coagulating any fluid body, eſpecially milk.

CURE *of Souls*, a benefice in the Chriſtian church, the incumbent whereof has the direction of conſciences within a pariſh.

CURETES, in antiquity, a ſort of prieſts, called alſo Corybantes, being, as ſome relate, the ſame with what the Druids and Bards were afterwards among the Gauls.

CURFEW, or COURFEW, a ſignal given in cities taken in war, &c. to the inhabitants to go to bed. Paſquin ſays, it was ſo called, as being intended to advertiſe the people to ſecure themſelves from the robberies and debaucheries of the night.

The moſt eminent curfew in England was that eſtabliſhed by William the Conqueror, who appointed, under ſevere penalties, that, at the ringing of a bell, at eight o'clock in the evening, every one ſhould put out their lights and fires, and go to bed: whence, to this day, a bell, rung about that time, is called a curfew-bell.

CURIA, in Roman antiquity, a certain diviſion or portion of a tribe.

CURIO, in Roman antiquity, the chief and prieſt of each curia, or ward, whoſe buſineſs it was to officiate at the ſacrifices of the curia, called curionia, and provide for them, the curia furniſhing him with a ſum of money on that conſideration.

CURLEW, the Engliſh name of a bird, called by authors, arquata and numenius. See the article NUMENIUS.

CURNOCK, a meaſure of corn, containing four buſhels, or half a quarter.

CURRAN, or CURRANT, in botany, a genus of plants, whoſe characters are the following:

It hath no prickles; the leaves are large; the flower conſiſts only of five leaves, which are placed in a circular order, and expand in form of a roſe: the ovary, which ariſes from the center of the flower-cup, becomes a globular fruit, which is produced in bunches

All ſorts of curran trees may be eaſily propagated by planting their cuttings, any time from September to March, but the autumn is the beſt, upon a ſpot of freſh earth, which, in the ſpring, muſt be kept very clear from weeds; and in very dry weather, if they are watered, it will greatly promote their growth. Theſe may remain two years in the nurſery; during which time, they muſt be pruned up for the purpoſes deſigned, that is, either to clear ſtems, if for ſtandards; or, if for walls, pales, or eſpaliers, they may be trained up flat.

Then they ſhould be planted out where they are to remain; the beſt ſeaſon for which is ſoon after the leaves begin to decay, that they may take root before winter, ſo that they may be in no danger of ſuffering from drought in the ſpring.

Theſe plants are generally planted in rows about ten feet aſunder, and four diſtance in the rows; but the beſt method is to train them againſt low eſpaliers, in which manner they will take up much leſs room in a garden, and their fruit will be much fairer.

The diſtance they ſhould be placed for an eſpalier, ought not to be leſs than ten or twelve feet, that their branches may be trained horizontally; which is of great importance to their bearing.

Thoſe that are planted againſt pales or walls, ſhould alſo be allowed the ſame diſtance; if they are planted againſt a ſouth-eaſt wall or pale, it will cauſe their fruit to ripen at leaſt a fortnight or three weeks ſooner than thoſe in the open air; and thoſe which are planted againſt a north wall or pale, will be proportionably later; ſo that by this method the fruit may be continued a long time in perfection, eſpecially if thoſe againſt the north pales are matted in the heat of the day.

Theſe plants produce their fruit upon the former year's wood, and alſo upon ſmall ſnags which come out of the old wood; ſo that, in pruning them, theſe ſnags ſhould be preſerved, and the young ſhoots ſhortened in proportion to their ſtrength. The only method, very neceſſary to be obſerved in pruning them, is not to lay their ſhoots too cloſe, and never to prune their ſnags to make them ſmooth: this, with a ſmall care in obſerving the manner of their growth, will be ſufficient to inſtruct any perſon how to manage this plant, ſo as to produce great quantities of fruit.

Theſe plants will thrive, and produce fruit, in almoſt any ſoil or ſituation, and are often planted under the ſhade of trees; but the fruit is always beſt when they are planted to the open air, and upon a dry ſoil.

Currants alſo ſignify a ſmaller kind of grapes brought principally from Zant and Cephalonia. They are gathered off the bunches, and laid to dry in the ſun, and ſo put up in large butts. They are open and pectoral; but are more uſed in the kitchen than in medicine.

Currant, or Courant Money, that money which paſſes in commerce from one to another.

CURRENT, in hydrography, a ſtream or flux of water in any direction.

Currents, in the ſea, are either natural and general, as ariſing from the diurnal rotation of the earth on its axis; or accidental and particular, cauſed by the waters being driven againſt promontories, or into gulphs and ſtreights; where, wanting room to ſpread, they are driven back, and thus diſturb the ordinary flux of the ſea.

The currents are ſo violent under the equator, where the motion of the earth is the greateſt, that they carry veſſels very ſpeedily from Africa to America; but abſolutely prevent their return the ſame way; ſo that ſhips are forced to run as far as the 40th degree of latitude, to find a paſſage into Europe.

In the Streights of Gibraltar, the currents almoſt conſtantly drive to the eaſtward, and carry ſhips into the Mediterranean: they are uſually, too, found to drive the ſame way in St. George's chanel. The great violence and dangerouſneſs of the ſea in the Streights of Magellan, is attributed to two contrary currents ſetting in, one from the ſouth, and the other from the north ſea.

Dr. Halley makes it highly probable, that in the Downs, in the Streights of Gibraltar, &c. there are under currents, whereby as much water is carried out, as is brought in by the upper currents. This he argues from the offing between the North and South Foreland, where it runs tide and half-tide, i. e. it is either ebb or flood in that part of the Downs three hours before it is ſo off at ſea: a certain ſign, that though the tide of flood runs aloft, yet the tide of ebb runs under-foot, i. e. cloſe by the ground; and ſo at the tide of ebb it will flow under-foot.

This he confirms by an experiment in the Baltic Sound, communicated to him by an able ſeaman preſent at the making it: Being there, then, with one of the king's frigates, they went with their pinnace into the mid-ſtream, and were carried violently by the current. Soon after that, they ſunk a baſket with a large cannon-bullet, to a certain depth of water, which gave check to the boat's motion; and ſinking it ſtill lower and lower, the boat was driven ahead to the windward, againſt the upper-current; the current aloft not being above four or five fathom deep. He added, that the lower the baſket was let down, the ſtronger the under-current was found.

From this principle it is eaſy to account for that vaſt draught of water continually pouring in with the current out of the Atlantic into the Mediterranean, through the Streights of Gibraltar; a paſſage about twenty miles broad; yet without any ſenſible riſing of the water along the coaſts of Barbary, &c. or any overflowing of the lands, which there lie very low.

Current, in navigation, may be defined, a certain progreſſive motion of the water of the ſea, in ſeveral places, either quite down to the bottom, or to a certain determinate depth, by which a ſhip may happen to be carried forward more ſwiftly, or retarded, in her courſe, according to the direction or ſetting of the current, in, with, or againſt, the courſe of the ſhip.

The method of finding the ſetting and drift of a current is thus: They firſt fix their boat, by throwing out a triangular piece of wood, with a piece of lead faſtened to it, and tied to the ſtem of the boat with a cord, and letting it ſink ſixty fathom, or more; or ſometimes, by a kettle tied by the bowl, and ſunk as the other: by either of theſe means, the boat is brought to ride as at anchor; which done, the log is hove, the glaſs turned, and as the log line veers out, the drift of the log is ſet with the compaſs.

This ſhews whether there be any current, or none; and if any, which way it ſets, and at what rate it drives, obſerving, however, to add ſomething to the velocity for the boat's drift; for though ſhe appears to ſtand ſtill, yet, in reality, ſhe is found to move. This addition experience has thus determined; if the line ſhe ride be ſixty fathom, a third part of the drift is to be added; if eighty fathom, a fourth; if an hundred, a fifth.

If a ſhip ſail along the direction of a current, it is evident the velocity of the current muſt be added to that of the veſſel: if her courſe be directly againſt the current, it muſt be ſubtracted; if ſhe ſails athwart the current, her motion will be compounded with that of the current, and her velocity augmented, or retarded, according to the angle of her direction with that of the direction of the current, i. e. ſhe will proceed in the diagonal of the two lines of direction, and will deſcribe or paſs through that diagonal in the ſame time wherein ſhe would have deſcribed either of the ſides, by the ſeparate forces.

Suppoſe a ſhip ſails N E. 30 miles, in a current ſetting E S E. 20 miles, in the ſame time; required her true courſe and diſtance?

GEOMETRICALLY.

Having drawn the compaſs N E S W, (plate XLVII. *fig.* 6.) let A be the place of the ſhip, and draw the N E. line $AB=30$; then will B be the place the ſhip would have arrived at, if there had been no current. From B draw the line BC parallel to the E S E. line Ac, making it equal to 20 miles, the current's drift; then will C be the ſhip's true place, the angle NAC her true courſe, and AC her true diſtance.

ARITHMETICALLY.

In the triangle ABC are given the ſide $AB=30$ miles, the ſide $BC=20$ miles, and the angle $ABC=112^{\circ}.\ 30'$. $=$ angle dAc $=$ diſtance between the S W. and E S E. lines; to find the angle BAC, and the ſide AC.

1. To find the angle A, it will be, As the ſum of the

ſide A B and B C = 50 — — — —	1.6989700
Is to their difference = 10 — — —	1.0000000
So is the tangent of the half ſum of the angles A and C = 33°. 45′. - - -	9.8448926
To the tangent of half their difference = 7°. 37′. — — — — — —	9.1259226

Whence the angle A will be = 26°. 08′. which, being added to the angle N A B, the courſe ſteered, will give the angle N A C, or true courſe = 71°, 08′, or E N E. a quarter eaſterly nearly.

To find the ſide A C, the ſhip's true diſtance, it will be,

As the ſine of the angle A = 26°. 08′. —	9.6497203
Is to the ſide B C — — = 20 — —	1.3010300
So is the ſine of the angle B = 112°. 30′.	9.9656153
To the ſide A C, the diſtance required = 414	1.6176250

Suppoſe a ſhip, making her way good within 7 points of the wind, is bound to a port lying directly to windward or N N E. diſtant 100 miles, and a current under-foot ſetting N. by W. 45 miles in the time the ſhip ſails 55 miles; required her true courſe and diſtance on each tack to gain her intended port, as alſo her diſtance ſhe muſt ſail by the log.

Geometrically.

Having drawn the compaſs N E S W. (*fig.* 7.) let A be the place ſailed from; draw the N N E. line A B equal to 100 miles, then will B repreſent the port the ſhip is bound to. Draw the lines A G, A *g*, at ſeven points diſtant from the wind line A B, and make each = 55 miles, the diſtance ſailed by the log during the experiment; through G and *g* draw the lines G D, *g d*, parallel to the W. by N. line A *m*, the ſetting of the current, making each = 45 miles, the drift of the current during the experiment, and draw the lines A D and A *d*; then will D or *d*, according as ſhe ſailed upon the larboard or ſtarboard tack, be the true place of the ſhip at the end of the experiment, or while ſhe ſails 55 miles by the log. From B draw the lines B C and B *c*, the former parallel to A *d*, and the latter parallel to A C, continuing them till they meet the lines A C and A *d* in C and *c*. The problem being thus conſtructed, the ſeveral requiſites may be meaſured by the line of chords and equal parts. For if the ſhip ſails firſt on the larboard tack, continuing her courſe till ſhe has ſailed by the log the diſtance A H, then will her true place be C, her true courſe the angle N A C, and her true diſtance A C; then getting her ſtarboard tacks on board, and ſtanding to the weſtward, when ſhe has ſailed by the log the diſtance C *n* = A *b*, ſhe will arrive at her intended port; for then her true place will be B, her true courſe the angle N A *c*, and her true diſtance B C = A *c*. But if ſhe firſt ſail on the ſtarboard tack, then muſt ſhe ſail by the log the diſtance A *b*, whereby her true place will be *c*; then getting her larboard tacks on board, and ſtanding to the eaſtward, till ſhe has ſailed by the log the diſtance *c p* = A H, ſhe will arrive at her intended port; for then her true place will be B, and her true diſtance *c* B = A C.

Arithmetically.

1. In the oblique-angled triangle A G D are given the ſide A G = 55, the ſide G D = 45. and the angle A G D = 67°. 30′. whence the angle G A D may be found = 47°. 40′. and the ſide A D or diſtance ſailed during the experiment = 56 25; and becauſe the line A C is nearer N, than the line A G, by the angle D A G; therefore from the angle N A G = 101°. 15′. take the angle D A G = 47°. 40′. the remainder = 53°. 35′. or ſomething more than N E. ¾ eaſterly, will be the true courſe on the larboard tack.

2. In the triangle A B C are given the angle B A C = 22°. 30′. the angle A C B = 91°. 11′. the angle C B A = 57°. 44′. and the ſide A B = 100; whence the ſides A C and B C, the reſpective diſtance on each tack, may be found, the former or A C = 85.07, and the latter or B C = 51.64.

To find the diſtance ſailed by the log on each tack to gain the port.—Becauſe the triangles A C H and A D G are ſimilar, it will be as A D = 56.24 : A C = 85.07 :: A G = 55 : A H = 83 1, the diſtance ſhe muſt ſail on her larboard tack: and becauſe the triangles A *d g* and A *c h* are ſimilar, it will be, as A *d* = 91 : A *c* = 51.64 :: A *g* = 55: A *b* = 31.2 = C *n*, the diſtance ſhe muſt ſail on her ſtarboard tack.

CURRIERS, thoſe who dreſs and colour leather after it comes from the tan-yard. See the article Skinners.

CURRYING, the method of preparing leather with oil, tallow, &c.

The chief buſineſs is to ſoften and ſouple cow and calve skins, which make the upper-leathers and quarters of ſhoes, covering of ſaddles, coaches, and other things which muſt keep out water. 1. Theſe skins, after coming from the tanner's yard, having many fleſhy fibres on them, the currier ſoaks them ſome time in common water. 2. He takes them out and ſtretches them on a very even wooden horſe; then with a paring-knife, he ſcrapes off all the ſuperfluous fleſh, and puts them in to ſoak again. 3. He puts them wet on a hurdle, and tramples them with his heels, till they begin to grow ſoft and pliant. 4. He ſoaks thereon train-oil, which by its unctuous quality, is the beſt liquor for this purpoſe. 5. He ſpreads them on large tables, and faſtens them at the ends. There with the help of an inſtrument, called a pummel, which is a thick piece of wood, the under-ſide of which is full of furrows croſſing each other, he folds, ſquares, and moves them forwards and backwards ſeveral times, under the teeth of this inſtrument, which breaks their too great ſtiffneſs. This is what is properly called currying. The order and number of theſe operations is varied by different curriers, but the material part is always the ſame. 6. After the skins are curried, there may be occaſion to colour them. The colours are black, white, red, yellow, green, &c. the other colours are given by the skinners, who differ from curriers in this, that they apply their colours on the fleſh ſide; the curriers on the hair ſide. In order to whiten skins, they are rubbed with lumps of chalk, or white lead, and afterwards with pumice-ſtone. 7. When a skin is to be made black, after having oiled and dried it, he paſſes over it a puff dipt in water impregnated with iron, and after this firſt wetting, he gives it another in a water prepared with ſoot, vinegar, and gum-arabic. Theſe different dyes gradually turn the skin black, and the operations are repeated till it be of a ſhining black. The grain and wrinkles which contribute to the ſoupleneſs of calves and cows leather, are made by the reiterated folds given to the skin in every direction, and by the care taken to ſcrape off all hard parts on the coloured ſide.

Explanation of Plate XLVIII.

The upper compartment of the plate repreſents a currier's ſhop, where all the operations of currying are performed.

Fig. 1. A. a workman treading the skins upon a hurdle.

Fig. 2. B. a workman ſcraping off the ſuperfluous fleſh with a paring-knife, on a wooden horſe.

Fig. 3. C. a workman ſtretching the skin, by rubbing it ſtrongly on the table with a piece of iron or copper called a ſtretching piece.

Fig. 4. D. a workman ſqueezing and creaſing the skin with the pummel.

Fig. 5. C. a workman ſcraping the skin with a tool called a round paring-knife.

Fig. 6. F. a workman creaſing the skin by beating it with a tool called a bigorne.

Lower Compartment of the Plate.

Fig. 1. A crotchet or fork.

Fig. 2. The ſtretching piece.

Fig. 3. A paring-knife.

Fig. 3. N°. 2. Section of the paring knife.

Fig. 3. N°. 3. A ſteel for ſharpening the paring-knife.

Fig. 4. The bigorne.

Fig. 5. A puff for colouring the skin.

Fig. 6. A pair of pincers, with its ſtring, for ſtretching the skin.

Fig. 7. A round paring-knife.

Fig. 7. N°. 2. A ſection of the round paring-knife.

Fig. 8. A view of the under-ſide of a pummel with fine teeth.

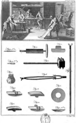


Fig. 9. View of the upper-ſide of the ſame pumm
Fig. 10. View of the upper-ſide of a pummel v
larger teeth.

Fig. 11. View of the under-ſide of a pummel mad
cork.

CURSITOR, a clerk belonging to the court of ch
cery, whoſe buſineſs it is to make out original writs.
the ſtatute 18 Edw. III. they are called clerks of cou
and are twenty-four in number, making a corporatio
themſelves. To each of them is allowed a diviſior
certain counties, into which they iſſue out the orig
writs required by the ſubject.

CURSOR, in mathematical inſtruments, is any ſr
piece that ſlides, as the piece in an equinoctial ring-
that ſlides to the day of the month; the little label of b
divided like a line of ſines, and ſliding in a groove al
the middle of another label, repreſenting the horizo
the analemma; and likewiſe a braſs point ſcrewed
the beam-compaſſes, which may be moved along the be
for the ſtriking of greater or leſs circles.

CURTAILING, in farriery, is the docking or cutt
off a horſe's tail.

This practice is no where ſo much uſed as in Engla
it being a popular tho' falſe opinion, that the taking a
the tail, makes the horſe's chine or back much ſtron
and more able to ſupport a burden.

CURTAIL-Double, a muſical wind inſtrument,
the baſſoon, which plays the baſs to the hautboy.

CURTAIN, or Curtin, in fortification. See
article Curtin.

CURTATE Distance, in aſtronomy, the diſta
of a planet from the ſun to that point where a perp
dicular let fall from the planet meets with the eclipti

CURTATION, in aſtronomy, is the interval
tween a planet's diſtance from the ſun, and the cur
diſtance.

CURTEYN, *Curtana*, in the British cuſtoms, k
Edward the Confeſſor's ſword, borne before the princ
coronations: its point is ſaid to be broken off, as
emblem of mercy.

CURTIN, Curtain, or Courtin, in fortificati
is that part of the rampart of a place which is betw
the flanks of two baſtions bordered with a parapet
feet high, behind which the ſoldiers ſtand to fire upon
covert-way and into the moat. As it is the beſt defen
of any part of the rampart, beſiegers never carry on th
attacks againſt the curtain, but againſt the faces of
baſtions, becauſe of their being defended only by
flank. See the article Flank.

Angle of the Curtin, that contained between the c
tin and the flank.

Complement of the Curtin. See the article Comp
ment.

CURVATOR Coccygis, in anatomy, a name gi
by Albinus to a muſcle of the coccyx, diſcovered by h
ſelf, and not deſcribed by any other author.

It ariſes with a double head, one from the inner,
the other from the lower and lateral part of the os
crum; and deſcending, terminates in three extremit
He gave the name from its office, which is the bend
the coccyx.

CURVATURE *of a Line*, is the peculiar manne
its bending, or flexure, by which it becomes a curve
ſuch and ſuch peculiar properties.

CURVES, in geometry, are lines which, running
continually in all directions, may be cut by a right l
in more points than one. The doctrine of curves,
of the figures and ſolids generated by them, conſtit
what we call the higher geometry. Curves are divi
into algebraical, or geometrical, and tranſcendental.

Geometrical curves, or lines, are divided into ord
according to the number of dimenſions of the equati
expreſſing the relation between the ordinates and abſci
or according to the number of points by which they m
be cut by a right line. So that a line of the firſt or
will be only a right line expreſſed by this equation, $y+$
$+b=0$. A line of the ſecond or quadratic order will
the conic ſections and circle, whoſe moſt general eq
tion is $y^2+axy+by+cx^2+dx+e=0$. A line of the th
order is that whoſe equation has three dimenſions,
may be cut by a right line in three points, whoſe m

but bx^2 not, the figure expreſſed by the equation remaining will be a parabolical hyperbola, having two hyperbolical legs to one aſymptote, and two parabolical legs converging one and the ſame way. And when the term ey is abſent, the figure will have but one diameter; but when not, it will have no diameter; and of this latter there are four different ſpecies, according to Sir Iſaac Newton.

In the firſt caſe of the equation, when the terms ax^3, bx^2, are wanting; that is, when the equation becomes $xy^2+ey=cx+d$, it expreſſes a figure conſiſting of three hyperbolas oppoſite to one another, one lying between the parallel aſymptotes, and the other two without, having three aſymptotes, one of which is the firſt and principal ordinate, and the other two are parallel to the abſciſs, and equally diſtant from it, or elſe two oppoſite hyperbolas without the aſymptotes, and a ſerpentine hyperbola between them; there being four different ſpecies of theſe curves, called by Sir Iſaac Newton the hyperboliſmæ of an hyperbola.

When the term cx^2 is negative, the figure, expreſſed by the equation $xy^2+ey=d-cx^2$, is a ſerpentine hyperbola, having only one aſymptote, being the principal ordinate, or elſe a conchoidal figure; there being three different ſpecies of theſe curves, called by Sir Iſaac Newton the hyperboliſmæ of an ellipſis.

When the term cx^2 is abſent, the equation $ey^2+ey=d$ expreſſes two hyperbolas, not lying in the oppoſite angles of the aſymptotes, but in the adjacent angles; there being two different ſpecies of theſe curves, called by Sir Iſaac Newton the hyperboliſmæ of a parabola.

The ſecond caſe of equations, viz. $xy=ax^3+bx^2+cx+d$, expreſſes a figure having two hyperbolical legs to one aſymptote, being the principal ordinate, and two parabolical legs. The third caſe of equations, $yy=ax^3+bx^2+cx+d$, expreſſes a figure having two parabolical legs running out contrary ways, and of theſe there are five different ſpecies: Sir Iſaac Newton calls them diverging or bell-form parabolas. See more concerning them under the article PARABOLA *Diverging*.

The fourth caſe of equations, $y=ax^3+bx^2+cx+d$, expreſſes a parabola with contrary legs, viz. the cubical parabola.

Thus, according to Sir Iſaac Newton, there are but 72 ſpecies of lines of the third order. But Mr. Sterling found out four more ſpecies of redundant hyperbolas; there are alſo two more of the deficient hyperbolas, expreſſed by the equation $xyy=bx^2+cx+d$, when $bx^2+cx+d=0$ has two unequal negative roots, and two equal negative roots; ſo that in reality there are 78 different ſpecies of lines of the third order.

5. How the ſeveral equations for all lines of the third order, when the ordinates are parallel to an aſymptote, may be tranſmuted into the four particular equations abovementioned, is elegantly enough ſhewn by Mr. Sterling in his *Illuſtratio Tractatus D. Newtoni de Enumeratione Linearum Tertii Ordinis.* The ſame is done by Mr. Nichol too, in the *Memoires de l'Academie Royale des Sciences, anno* 1728, but triflingly long and tedious. Although we have ſaid that the lines of the third order conſiſt either of hyperbolical or parabolical parts, yet ſome of them have, beſides, ovals belonging to them, either ſeparate from the infinite legs, or joining to them; they have alſo double points, which make a part of the curve, and other notable diſtinctions, as may be ſeen in Sir Iſaac Newton's enumerations of theſe lines, where you have their figures as well as the qualifications of the ſeveral equations expreſſing each different ſpecies, chiefly ariſing from the equation, expreſſing the value of the ordinate y in the terms of the abſciſs x; giving no ordinate, as often as that value is the ſquare root of a negative quantity, or part of that value, an infinitely ſmall ordinate; a finite one, or an infinitely great one: for example, in the firſt caſe of equations, $xy^2-ey=ax^3+bx^2+cx+d$, it will be found by extracting the root that $y=\frac{e}{2x}\pm\frac{\sqrt{ax^4+bx^3+cx^2+dx+\frac{1}{4}ee}}{x}$; ſo that y will be poſſible as often as $ax^4+bx^3+cx^2+dx+\frac{1}{4}ee$ is affirmative, and impoſſible when the ſame is negative: and the number of times that this can happen, will appear from the deſcription of a biquadratical parabola, whoſe abſciſs is x, and ordinate $ax^4+bx^3+cx^2+dx+ee$. See the ingenious Mr. Stewart's Comment, or Sir Iſaac Newton's Quadratures.

Sir Iſaac Newton tells us, that curves may be generated by ſhadows. He ſays, if upon an infinite plane illuminated from a lucid point the ſhadows of figures be projected, the ſhadows of the conic ſections will be always conic ſections; thoſe of the curves of the ſecond kind will be always curves of the ſecond kind; thoſe of the curves of the third kind will be always curves of the third kind; and ſo on ad infinitum. And as a circle by projecting its ſhadow generates all the conic ſections, ſo the five diverging parabolas, by their ſhadows, will generate and exhibit all the reſt of the curves of the ſecond kind: and ſo ſome of the moſt ſimple curves of other kinds may be found, which will form, by their ſhadows upon a plane, projected from a lucid point, all the reſt of the curves of that ſame kind. But as Sir Iſaac Newton has not either demonſtrated what he here ſays, or particularly ſhewn how his curves of the ſecond order may be derived from the ſhadows of the diverging parabolas, you have in the French Memoirs a demonſtration of this, and a ſpecimen of a few of the curves of the ſecond order, which may be generated by a plane's cutting a cone or ſolid formed from the motion of an infinite right line along a diverging parabola (having an oval) always paſſing through a given or fixed point above the plane of that parabola.

If it be ſo difficult to underſtand the nature, properties, and number of the curves of the ſecond and third kinds, how much more ſo muſt it be to attain to a glimpſe of that prodigious number and variety expreſſed by the equations of the ſucceeding higher dimenſions: And again, what an infinite increaſe of difficulty will ariſe in apprehending the nature of the infinite number of curves which do not lie in the ſame plane? When one duly conſiders this, it muſt be confeſſed that the moſt ſkilful and penetrating mathematician poſſible, may really be ſaid to know little or nothing at all concerning the nature of curve lines, however he may otherwiſe think.—Thoſe who have a mind to ſee how far this doctrine has been advanced, with regard to curves of the higher orders, as well as thoſe of the firſt and ſecond orders, may conſult Mr. Maclaurin's *Organica Geometrica*, and Mr. Brackenridge's *Exercitatio Geometrica de Curvarum Deſcriptione*, &c.

For the nature, &c. of tranſcendental curves, ſee the article TRANSCENDENTAL *Curves*.

Organical Deſcription of CURVES. If the given angle CAD (plate XLVII. *fig.* 8.) move about the angular point A given in poſition, and the given angle CBD about the angular point B given alſo in poſition, on this condition, that the legs AD, BD, ſhall always cut one another in the right line EF, given likewiſe in poſition; it is required to determine the curve which the interſection C of the other legs AC, BC, deſcribes.

Produce CA to d, ſo that Ad ſhall be $=$ AD, and produce CB to b, ſo that Bb ſhall be $=$ BD. Make the angle Ade equal to the angle ADE, and the angle Bbf equal to the angle BDF, and produce AB on both ſides until it meet de and bf in e and f. Produce alſo ed to G, that dG ſhall be $=bf$, and from the point C to the line AB, draw CH parallel to ed, and CK parallel to fb. And conceiving the lines eG, fb, to remain immoveable while the angles CAD, CBD, move by the aforeſaid law about the poles A and B, Gd will always be equal to fb, and the triangle CHK will be given in ſpecie. Make therefore $\mathrm{A}e=a$, $e\mathrm{G}=b$, $\mathrm{B}f=c$, $\mathrm{AB}=m$, $\mathrm{BK}=x$, and $\mathrm{CK}=y$; and BK will be : CK :: Bf : fb; therefore $fb=\frac{cy}{x}=\mathrm{G}d$: take this from G$e$, and there will remain $ed=b-\frac{cy}{x}$. Since the triangle CHK is given in ſpecie, make CK : CH :: d : e, and CH : HK :: e : f, and CH will be $=\frac{ey}{d}$, and $\mathrm{HK}=\frac{fy}{d}$: and conſequently $\mathrm{AH}=m-x-\frac{fy}{d}$. But AH : HC :: A$e$: ed; that is, $m-x-\frac{f}{d}y:\frac{ey}{d}::a:b-\frac{cy}{x}$. Therefore, by multiplying the means and extremes together, there will ariſe $mb-\frac{mcy}{x}-bx+cy-\frac{bf}{d}y+\frac{cfyy}{dx}=\frac{aey}{d}$. Multiply all the terms by dx, and reduce them into order, and there will come out

$$\begin{array}{l} \quad +dc \\ fcyy - aexy - demy - bdxx + bdmx = 0. \\ \quad -fb \end{array}$$

Where, ſince the unknown quantities x and y aſcend only to two dimenſions, it is evident, that the curve line deſcribed by the point C is a conic ſection. Make $\frac{ae+fb-dc}{c} = 2p$, then $yy = \frac{2p}{f}xy + \frac{dm}{f}y + \frac{bd}{fc}x^2 - \frac{bdm}{fc}x$. And the ſquare root being extracted, $y = \frac{p}{f}x + \frac{dm}{2f} \pm \sqrt{\frac{p^2}{f^2}x^2 + \frac{bd}{fc}x^2 + \frac{pdm}{f^2}x - \frac{bdm}{fc}x + \frac{d^2m^2}{4f^2}}$. Whence we infer, that the curve is an hyperbola, if $\frac{bd}{fc}$ be affirmative or negative and leſs than $\frac{p^2}{f^2}$; and a parabola, if $\frac{bd}{fc}$ be negative and equal to $\frac{p^2}{f^2}$; an ellipſis or a circle, if $\frac{bd}{fc}$ be both negative and greater than $\frac{p^2}{f^2}$.

CURVET, or Corvet, in the manege, an air in which the horſe's legs are raiſed higher than in the demivolt; being a kind of leap up, and a little forwards, wherein the horſe raiſes both his fore legs at once, equally advanced, when he is going ſtraight forward and not in a circle, and as his fore-legs are falling, he immediately raiſes his hind-legs, equally advanced, and not one before the other: ſo that all his four legs are in the air at once; and as he ſets them down, he marks but twice with them.

CURVILINEAR, or Curvilineal, is ſaid of figures bounded by curves, or crooked lines. See the article Curves.

CURULE Chair, in Roman antiquity, a chair adorned with ivory, wherein the great magiſtrates of Rome had a right to ſit, and be carried.

CUSCUTA, dodder, in botany, a genus of plants, whoſe corolla conſiſts of a ſingle, ovated petal, a little longer than the cup, divided into four obtuſe ſegments at the mouth: the pericarpium is fleſhy, roundiſh, and bilocular, opening horizontally: the ſeeds are two in number.

The ancients recommended it as a purge: however, we eſteem it more as an attenuant and aperient in obſtructions of the viſcera, in jaundices, dropſies, and other chronic diſeaſes.

CUSP, in aſtronomy, a term uſed to expreſs the points or horns of the moon, or other luminary.

Cusp, in aſtrology, is uſed for the firſt point of each of the twelve houſes, in a figure or ſcheme of the heavens. See the article House.

CUSPIDATED Plants, in botany, are ſuch plants whoſe leaves are pointed like a ſpear.

Cuspidated *Hyperbola*, that whoſe points concur in the angle of contact, and there terminate. See Hyperbola.

CUSTOM, a very comprehenſive term, denoting the manners, ceremonies, and faſhions of a people, which having turned into a habit, and paſſed into uſe, obtains the force of laws; in which ſenſe it implies ſuch uſages as, though voluntary at firſt, are yet, by practice, become neceſſary.

Cuſtom is hence, both by lawyers and civilians, defined *lex non ſcripta*, a law, or right, not written, eſtabliſhed by long uſage, and the conſent of our anceſtors: in which ſenſe it ſtands oppoſed to the *lex ſcripta*, or the written law.

Custom *of Merchants*.—If a merchant gives a character of a ſtranger to one who ſells him goods, he may be obliged to ſatisfy the debt of the ſtranger for the goods ſold, by the cuſtom of merchants.

Customs, in commerce, the tribute or toll paid by merchants to the king, for goods exported or imported: they are otherwiſe called duties. See Duty.

Custom-House, an office eſtabliſhed by the king's authority in maritime cities, or port towns, for the receipt and management of the cuſtoms and duties of importation and exportation, impoſed on merchandiſes, and regulated by books of rates.

Custom-Officers ſhall not have any ſhips of their own, nor may they uſe merchandiſe, factorage, nor keep a tavern, &c.

CUSTOMARY Tenants, in law, ſuch tenants as hold by the cuſtom of the manor, as their ſpecial evidence. Theſe were anciently bond-men, or ſuch as held *tenura bondagii*.

CUSTOS, in muſic, the ſame with moſtra or index.

Custos Brevium, the principal clerk belonging to the court of Common pleas, whoſe buſineſs it is to receive and keep all the writs made returnable in that court, filing every return by itſelf: and at the end of each term, to receive of the prothonotaries all the records of the Niſi Prius, called the poſteas.

Custos Rotulorum, an officer who has the cuſtody of the rolls and records of the ſeſſions of peace, and alſo of the commiſſion of the peace itſelf.

CUTANEOUS, in general, an appellation given to whatever belongs to the cutis, or ſkin: hence we meet with cutaneous caruncles, diſorders, eruptions, &c. See the articles Caruncle, Cutis, Cuticle, Itch, &c.

CUTICLE, *Cuticula*, in anatomy, a thin membrane, cloſely lying upon the ſkin, or cutis, of which it ſeems a part, and to which it adheres very firmly, being aſſiſted by the intervention of the corpus reticulare.

CUTICULAR, the ſame with cutaneous. See the article Cutaneous.

CUTIS, the ſkin, in anatomy, the univerſal integument of the body, or a ſubſtance made up of ſeveral kinds of tendinous, membranous, vaſcular, and nervous fibres, the intertexture of which is ſo much the more wonderful, as it is difficult to unfold; for their directions are as various as thoſe of the ſtuff of which an hat conſiſts. This texture is what we commonly call leather, and it makes the body of the ſkin. It is not eaſily torn, may be elongated in all directions, and afterwards recovers itſelf: on the poſterior parts of the body it is thicker and more lax than on the fore parts; and on the palms of the hands and ſoles of the feet, it is both very thick and very ſolid. It is generally more difficult to be pierced by pointed inſtruments in the belly than in the back.

The outer ſurface of this ſubſtance is furniſhed with ſmall eminences, which anatomiſts call papillæ, in which the capillary filaments of the cutaneous nerves terminate by ſmall radiated pencils. The greateſt part of theſe papillæ is flat, of different breadths, and ſeparated by ſulci, which form a kind of irregular lozenges. The papillæ of the palm of the hand, ſole of the foot, and of the fingers and toes, are higher than on the other parts of the body; but they are likewiſe ſmaller, cloſely united, and placed endwiſe in particular rows, which repreſent all kinds of lines. The papillæ appear to be ſurrounded at their baſes by a ſoft, mucilaginous ſubſtance, called corpus reticulare, or mucoſum, which fills the interſtices between them, and repreſents a kind of net-work, the meſhes of which ſurround each papilla; this reticular or vaſcular texture is of various forms and figures in the different parts of the body.

The inner ſurface of the ſkin is covered by very ſmall tubercles, commonly called cutaneous glands, and they are likewiſe termed glandulæ miliares, from their reſemblance to millet ſeeds. Theſe tubercles are partly fixed in ſmall foſſulæ, in the ſubſtance of the ſkin, which anſwer to the ſame number of ſmall cavities in the corpus adipoſum. Their excretory ducts open on the outer ſurface of the ſkin. The greateſt part of them furniſhes ſweat, and others a fatty oily matter, of different thickneſs, which M. Morgagni calls ſandulæ ſebaceæ. The late M. Duvernoy demonſtrated to the Royal Academy that the ſtructure of ſome of theſe cutaneous glands reſembled the circumvolutions of ſmall inteſtines, plentifully ſtored with capillary veſſels.

Beſides theſe corpuſcles, there are other ſmall ſolid bodies, almoſt oval, contained in the ſubſtance of the ſkin; theſe are the roots or bulbs from whence the hairs ariſe.

Beſides ſeveral conſiderable openings in the ſkin, it is perforated by an infinite number of ſmall holes, called pores, which are of two kinds; ſome are more or leſs perceivable by the naked eye, ſuch as the orifices of the milky ducts of the mammæ, the orifices of the excretory canals of the cutaneous glands, and the paſſages of the hairs.

The other pores are imperceptible to the naked eye, but viſible through a microſcope; and their exiſtence is likewiſe proved by the cutaneous tranſpiration, and by the effects of topical applications; and from theſe two phænomena they have been divided into arterial and venous pores.

There are different adheſions and folds of the ſkin in different parts of the body.

The outſide of the ſkin is covered by a thin tranſparent web, cloſely joined to it, which is called epidermis, cuticula, or ſcarf ſkin.

The ſubſtance of the cuticula appears to be very uniform on the ſide next the ſkin, and to be compoſed, on the other ſide, of a great number of very fine, ſmall, ſquamous laminæ: this ſubſtance is very ſolid and compact, but yet capable of being extended and thickened. The origin of the epidermis is as obſcure as its regeneration is evident, ſudden, and ſurpriſing. The epidermis adheres very cloſely to the cutaneous papillæ, but ſtill cloſer to the corpus reticulare; and they ſeem to be true portions or continuations of each other. It covers the ſkin through its whole extent, except at the places where the nails lie; it is marked with the ſame furrows and lozenges as the ſkin, and has the ſame openings and pores. The epidermis ſeems to inſinuate itſelf into the ſmall pores, in order to complete the excretory tubes of the cutaneous glands. The foſſulæ of the hairs have likewiſe the ſame productions of the epidermis; and it ſeems to give a ſort of coat to the hairs themſelves: and laſtly, the imperceptible ducts of the cutaneous pores are lined by it.

The uſes of the ſkin are numerous: 1. To ſurround, cover, and defend the parts that lie underneath it. 2. To be the organ of feeling. 3. To be an univerſal emunctory to the body, cleanſing the blood of its redundancies, by the means of ſweat and perſpiration; while theſe, at the ſame time, ſerve to prevent the acidity or drineſs of the cutis itſelf.

CUTLER, an artificer, whoſe buſineſs it is to forge, temper, and mount all ſorts of knives, razors, ſhears, ſciſſars, ſurgeons inſtruments, and ſword-blades.

Explanation of Plate XLIX.

The upper compartment of the plate repreſents a cutler's ſhop.

Fig. 1. The forge.
Fig. 2. A workman poliſhing on the wheel.
Fig. 3. A workman ſetting a razor on a hone.
Fig. 4. A workman drilling with a bow.
Fig. 5. A workman filing.
Fig. 6. The miſtreſs ranging the goods.
Fig. 7. A man turning the wheel.
a, the anvil, with its block and hammer.

Lower Compartment.

Fig. 1. The drill, with its bow and plate.
Fig. 2. A turn-ſcrew, or ſcrew-driver.
Fig. 3. A ſoft German ſtone.
Fig. 4. Round-bitted pincers.
Fig. 5. Hand-vice.
Fig. 6. Flat pliers.
Fig. 7. Round pliers.
Fig. 8. A ſaw.
Fig. 9. Burniſhing-ſtick.
Fig. 10. Forge hammer.
Fig. 11. The finiſhing hammer.
Fig. 12. A knife-file.
Fig. 13. A hone for ſetting razors and pen-knives.
Fig. 14. A ſtrap for ſmoothing the edge after ſetting.
Fig. 15. A rivetting hammer.
Fig. 16. A rivetting anvil.
Fig. 17. A punch.
Fig. 18. A cold chiſel.
Fig. 19. A flat file.
Fig. 20. Large vice.
Fig. 21. The anvil.
Fig. 22 The poliſhing wheel.

CUTTER, in naval affairs, a ſmall veſſel uſed to navigate in the channel of England: they have commonly one maſt, and are rigged as ſloops: ſome of theſe are ſmugglers, and ſome veſſels in the king's ſervice employed to catch the ſmugglers.

CUTTING, in heraldry, is uſed for the dividing a ſhield into two equal parts, from right to left, parallel to the horizon, or in the feſſe-way.

CUTTING, in painting, the laying one ſtrong lively colour over another, without any ſhade or ſoftening. The cutting of colours hath always a diſagreeable effect.

CUTTING, in ſurgery, the operation of extracting the ſtone out of the human body by ſection.

CUTTING *in Wood*, a particular kind of ſculpture, or engraving, denominated from the matter whereon it is employed.

The art of cutting in wood was certainly carried to a very great height about one hundred and ſixty years ago: at preſent it is very low in eſteem, as having been long neglected, and the application of artiſts wholly employed on copper, as the moſt eaſy and promiſing province. The cutter in wood needs no other inſtruments than little ſharp knives, chiſſels, and gravers of different ſizes.

The firſt thing he does, is to take a plank or block of pear-tree, or box, which he prepares of the ſize and thickneſs intended, and makes it very even and ſmooth on the ſide to be cut: on this block he draws the deſign with a pen, or pencil, juſt as it ought to be printed. Thoſe who cannot draw their own deſigns, make uſe of thoſe done by another, which they faſten on the block with paſte, the ſtrokes or lines being turned towards the wood: when the paper is dry, they waſh it gently over with a ſponge dipped in water, which done, they take off the paper by degrees, ſtill rubbing it a little with the tip of the finger, till there is nothing left on the block but the ſtrokes of ink that form the deſign, which marks out ſo much of the block as is to be ſpared, or left ſtanding; the reſt they cut off and take away as curiouſly as they can with the point of their ſharp inſtruments.

CUTTINGS, or SLIPS, in gardening, the branches or ſprigs of trees, or plants, cut or ſlipped off, to ſet again, which is done in any ſmall fine earth. The beſt time for this operation is from the middle of Auguſt to the middle of April; but when it is done, the ſap ought not to be too much in the top, leſt it die or decay before that part in the earth has root enough to ſupport the top: neither muſt it be very dry or ſcanty, for the ſap in the branches aſſiſts it to ſtrike roots: if done in the ſpring, let them not fail of water in the ſummer. In providing them, ſuch branches as have burs, knobs, or joints, are to be cut off, two or three inches beneath the burs, &c. and the leaves are to be ſtripped off ſo far as they are placed in the earth, leaving no ſide branch: ſmall top ſprigs, of two or three years growth, are the beſt for this operation.

CUT-WATER, in naval architecture, the foremoſt part of the prow of a ſhip, or that part which firſt divides the fluid. See the article STEM.

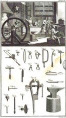
CYANUS, the blue-bottle, in botany, makes a diſtinct genus of plants, according to Tournefort, but is comprehended by Linnæus among the centaurea

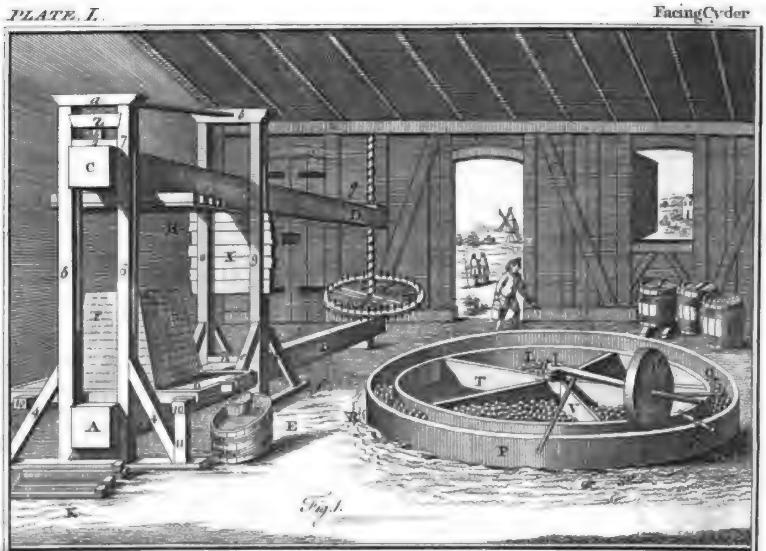
This plant is an alexipharmic and uterine. It is ſaid to be of uſe alſo in the king's evil, in palpitations of the heart; and a water diſtilled from it is of ſervice in inflammations of the eyes, &c.

CYCLAMEN, ſow-bread, in botany. See the article ARTHANITA.

CYCLE, in chronology, a certain period or ſeries of numbers, which regularly proceed from the firſt to the laſt, and then return again to the firſt, and ſo circulate perpetually.

CYCLE *of the Sun*, a revolution of 28 years, which being elapſed, the dominical or Sunday-letters return to their former place, and proceed in the ſame order as before, according to the Julian calendar. But the reformation made therein by pope Gregory, has occaſioned a con-




a
b
C
7
D
H
X
9
6
F
G
A
E
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V
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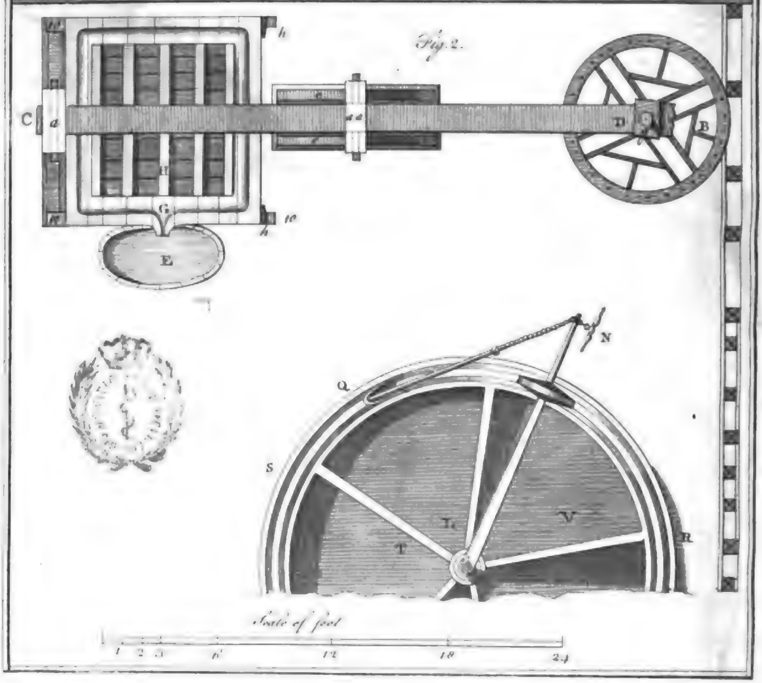
Fig. 1.


C
a
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h
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a a
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B
N
Q
S
T
L
V
R
Scale of feet
1
2
3
6
12
18
24

Fig. 2.

are mixed with their juices; the anſwer is, this will have no other effect than a kindly diluting, natural to the fruit, by which means a ſpeedier fermentation enſues, and all heterogeneous humid particles are thrown off.

The apples are then ground, and the pummice is received in a large open-mouthed veſſel, capable of containing as much thereof as is ſufficient for one making, or one cheeſe. Though it has been a cuſtom to let the pummice remain ſome hours in the veſſel appropriated to contain it, yet that practice is by no means commendable; for if the fruits did not come ripe from the trees, or otherwiſe matured, the pummice, continuing in the vat too long, will acquire ſuch harſhneſs and coarſeneſs from the ſkins as is never to be got rid of; and if the pummice is of well ripened fruit, the continuing too long there will occaſion it to contract a ſharpneſs that very often is followed with want of ſpirit and pricking; nay, ſometimes it even becomes vinegar, or always continues of a wheyiſh colour; all which proceeds from the heat of fermentation that it almoſt inſtantly falls into on lying together; the pummice therefore ſhould remain no longer in the vat, than until there may be enough broke for one preſſing, or that all be made into a cheeſe, and preſſed the ſame day it is broken.

Explanation of Plate L.

The upper compartment, or *fig.* 1. is a perſpective view of the cyder-preſs and apple-mill.

A, B, the bottom, or lower beam. C, D, the upper beam. 5, 6, 7, 8, 9, the uprights. 4, 4, *e*, *e*, ſpurs. Z, 2. 12, braces, or croſs-pieces. *a*, *b*, capitals. *x*, blocks. *g*, the ſcrew. E, the back, or receiver. F, the cheeſe, or cake of pummice, placed on the ſtage or baſon. G, the ſtage or baſon. 10, 10, beams that ſupport the pieces of which the baſon is compoſed. 11 Perpendicular pieces for ſupporting theſe beams. H, the buckler. R, S, Q, a circular trough of the apple-mill. T, L, V, compartments, or diviſions, for different ſorts of apples. M, the mill-ſtone. L, M, axis of the mill-ſtone. N, the ſpring-tree bar.

Fig. 2. Plan of the preſs and apple-mill. The ſame letters repreſent the ſame parts as in *fig.* 1.

When the cyder is thus preſſed, and cleared from any impurities by ſtraining it through a hair ſieve, it is placed in a proper caſk to be fermented. See Fermentation.

CYGNUS. See the article Swan.

Cygnus, in aſtronomy, a conſtellation of the northern hemiſphere, conſiſting of 17 ſtars according to Ptolemy's catalogue, of 19 in Tycho's, and in the Britannic catalogue of 107.

CYLINDER, in geometry, a ſolid ſuppoſed to be generated in the following manner.

If any indefinite right line S Z (plate XLVII. *fig* 10) being without the plane of the circle V X Y, move about the circumference of that circle always parallel to itſelf, until it be returned to the ſame place from whence it went; then the indefinite ſolid contained under the baſe or circle V X Y, and the ſuperficies generated after this manner by the right line S Z, is called a cylinder, and the ſaid ſuperficies is called the ſuperficies of it; and if the line S Z be perpendicular to the plane of the baſe, the cylinder is called a right one; but if not, an oblique or ſcalene one.

The ſection of every cylinder by a plane oblique to its baſe is an ellipſis.

The ſuperficies of a right cylinder is equal to the periphery of the baſe, multiplied into the length of its ſide.

The ſolidity of a cylinder is equal to the area of its baſe, multiplied into its altitude.

Cylinders of the ſame baſe, and ſtanding between the ſame parallels, are equal.

Every cylinder is to a ſpheroid inſcribed in it, as 3 to 2.

If the altitudes of two right cylinders be equal to the diameters of their baſes, thoſe cylinders are to one another as the cubes of the diameters of their baſes.

We have obſerved under the article Circle, that if the diameter of any circle be multiplied by 3.14159,26536—, the product will be the circumference; and ſince every cylinder may be conſidered as made of an infinite number of equal circles, it follows, that as 1, to 3.14159,26536—, ſo is the diameter of any cylinder multiplied by the height, to the ſuperficies of the cylinder: wherefore, if the product of the height of the cylinder into the diameter be multiplied by 3.14159,26536—, the product will give the ſuperficies of the cylinder.

And hence it alſo follows, that the ſolidity of any cylinder is found by multiplying the area of its baſe by its height or altitude: putting therefore r for the radius of the baſe, c for the circumference, and a for the altitude, we ſhall have $\frac{cra}{2} =$ the ſolidity. But if the altitude be equal to the diameter, then the ſolidity will be $\frac{cr}{2} \times 2r = crr$.

And becauſe as 1, to .78539,81634—; ſo is the ſquare of the diameter of any circle to its area. See Circle.

Therefore as 1, to .78539,81634—; ſo is the ſquare of the diameter of the baſe of the cylinder, multiplied into its height, to its ſolid content.

Alſo becauſe as 1, to 3.14159,26536—; ſo is the ſquare of the radius to the area of the circle; it will be as 1, to 3.14159,26536—; ſo is the ſquare of the radius of the baſe of the cylinder, multiplied into its height, to the ſolid content.

Again, becauſe as 1, to .07957,74715; ſo is the ſquare of the circumference of any circle to its area; therefore, as 1, to .07957,74715; ſo is the ſquare of the circumference of any cylinder, multiplied by its altitude, to its ſolidity.

Rolling Cylinder, in philoſophy, a cylinder which rolls upon an inclined plane.

The phænomenon of the rolling cylinder may be eaſily accounted for from what we have obſerved under Center *of Gravity*.

For let ABED (plate XLVII. *fig.* 11.) repreſent a ſection of a cylinder of wood, biaſſed on one ſide with a cylindric piece of lead, as B; this will bring the center of gravity out of the center of magnitude C, to ſome point G, between C and B. Let F H be an inclined plane, whoſe baſe is F L. It is evident the cylinder laid upon the plane will no where reſt but there where a perpendicular to the horizon F L paſſes through the center of gravity G, and that point of the plane E, in which the cylinder touches it; and this in all angles of inclination of the plane, leſs than that whoſe ſine is equal to C G, the radius being C D. This will happen in two ſituations ABED, and *abed*; becauſe, when the cylinder moves, the center of gravity deſcribing a circle round the center of magnitude C, this circle will meet the perpendicular in two points G and *g*, in each of which the center of gravity being ſupported, the cylinder will reſt: therefore the cylinder moves from E to *e* by the deſcent of the center of gravity from G to *g*, in the arch of the cycloid G *b g*.

If the cylinder ABED (plate XLVII. *fig.* 12.) inſiſting on the horizontal line E L in the point E, has the center of gravity G in the horizontal diameter D B, it will gravitate in the perpendicular G *e*; if therefore a plane F H touch the cylinder in the point *e*, it is plain the cylinder cannot either aſcend or deſcend on ſuch a plane; becauſe G, in any ſituation between *e*, and H or *e*, and F, will gravitate to the left or right from the point in which the cylinder touches the plane; and ſo will in either caſe bring it back to the point *e*.

Cylinder-Charge, in gunnery, that part of a great gun which is poſſeſſed by the powder and ball.

Cylinder Concave, in gunnery, is all the chace of a piece of ordnance.

Cylinder Vacant, in gunnery, is that part of the hollow that remains empty, after the gun is charged.

CYLINDRICAL, ſomething in the form of, or reſembling, a cylinder: thus we ſay, a cylindrical column, cylindrical compaſſes, mirrors, &c.

CYLINDROID, in geometry, a ſolid body approaching to the figure of a cylinder, but differing from it in ſome reſpect, as having the baſes elliptical, but parallel and equal.

The word is formed from the Greek, κυλινδρος, a cylinder, and ειδος, reſemblance.

CYMA, or CYMATIUM, in architecture. See CYMATIUM.

CYMA, in botany, the tender ſtalk which herbs ſend forth in the beginning of the ſpring; particularly thoſe of the cabbage kind.

CYMATIUM, in architecture, a member, or moulding, of the corniche, the profile of which is waved; that is, concave at top, and convex at bottom. See the article CORNICHE.

Vitruvius does not confine the cymatium to the corniche, but uſes it indifferently for any ſimilar moulding, wherever he meets with it, in which he differs from the moſt accurate among the moderns. Felibien makes two kinds of cymatiums, the one right, and the other inverted. In the firſt, that part which projects the fartheſt is concave, and is otherwiſe called gula recta, and doucine: in the other, the part that projects fartheſt is convex, called gula inverſa, or ſalon. The Engliſh architects do not uſually give the name cymatium to theſe mouldings, except when they are found on the tops of corniches; but the workmen uſe the name indifferently, wherever they are found.

Tuſcan CYMATIUM conſiſts of an ovalo or quarter-round. Philander makes two Doric cymatiums, of which this is one. Baldus calls this the Leſbian aſtragal.

Doric CYMATIUM is a cavetto, or a cavity leſs than a ſemicircle, having its projecture ſubduple to its height. See the article DORIC.

Leſbian CYMATIUM, according to Vitruvius, is what our architects otherwiſe call talon, viz. a concavo-convex member, having its projecture ſubduple to its height.

CYMBAL, κυμβαλον, a muſical inſtrument in uſe among the ancients. The cymbal was round, made of braſs, like our kettle-drums, and, as ſome think, in their form, but ſmaller, and of different uſe.

Caſſiodorus calls it acetabulum, i. e. a hollow piece, the name of a cup, or cavity of a bone, wherein another is lodged or articulated.

Authors compare cymbals to the lips, becauſe they formed ſounds by preſſing and ſtriking one againſt another, whence they muſt have been compoſed of two ſeveral parts. Ovid gives cymbals the epithet of *genialia*, becauſe they were uſed at weddings and other diverſions. The Jews had their cymbals, or, at leaſt, inſtruments which tranſlators render cymbals; but as to their matter and form, critics are ſtill in the dark. The modern cymbal is a mean inſtrument, chiefly in uſe among vagrants, gypſies, &c.

CYMBIFORME Os, a bone otherwiſe called naviculare. See NAVICULARE.

CYNANTHROPIA, in medicine, the diſtemper occaſioned by the bite of a mad dog, wherein the patient avoids the light and every thing that is bright, and dreads the water ſo much, that he trembles at the ſight or even the remembrance of it. See HYDROPHOBIA.

CYNARA. See the article ARTICHOKE.

CYNICS, a ſect of ancient philoſophers, who valued themſelves upon their contempt of riches and ſtate, arts and ſciences, and every thing, in ſhort, except virtue or morality.

The Cynic philoſophers owe their origin and inſtitution to Antiſthenes of Athens, a diſciple of Socrates, who, being aſked of what uſe his philoſophy had been to him, replied, "It enables me to live with myſelf." Diogenes was the moſt famous of his diſciples, in whoſe life the ſyſtem of this philoſophy appears in its greateſt perfection: he led a moſt wretched life, a tub having ſerved him for a lodging, which he rolled before him, wherever he went; yet he was, nevertheleſs, not the more humble on account of his ragged cloak, bag, and tub; for, one day, entering Plato's houſe, at a time that there was a ſplendid entertainment there, for ſeveral perſons of diſtinction, he jumped up upon a very rich couch, in all his dirt, ſaying, "I trample on the pride of Plato." "Yes (replied Plato) but with greater pride, Diogenes." He had the utmoſt contempt for all the human race; for he walked the ſtreets of Athens, at noon-day, with a lighted lantern in his hand, telling the people, "He was in ſearch of a man." Amongſt many excellent maxims of morality, he held ſome very pernicious opinions; for he uſed to ſay, that the uninterrupted good fortune of Harpalus, who generally paſſed for a thief and a robber, was a teſtimony againſt the gods. He regarded chaſtity and modeſty as weakneſſes; hence Laertius obſerves of him, that he did every thing openly, whether it belonged to Ceres or Venus, though he adds that Diogenes only ran to an exceſs of impudence to put others out of conceit with it: but impudence was the characteriſtic of theſe philoſophers, who argued, that what was right to be done, might be done at all times, and in all places. The chief principle of this ſect, in common with the Stoics, was, that we ſhould follow nature; but they differed from the Stoics in their explanation of that maxim, the Cynics being of opinion that a man followed nature, that gratified his natural motions and appetites; while the Stoics underſtood right reaſon, by the word nature.

CYNIC SPASM, a kind of convulſion, wherein the patient imitates the howlings of dogs.

CYNOGLOSSUM, hound's tongue, in botany, a genus of plants, whoſe corolla conſiſts of a ſingle petal, of the length of the cup; the tube is cylindric, and ſhorter than the limb, which is divided into five obtuſe ſegments; the fruit conſiſts of four roundiſh depreſſed capſules; the ſeed is ſingle, of an oval figure, gibbous, acuminated, and ſmooth.

Its root is kept in the ſhops, and is eſteemed a pectoral and narcotic.

Some recommend it in catarrhs, the gonorrhœa, and ſcrophulous caſes.

CYNOSURA, in aſtronomy, a name given by the Greeks to the conſtellation of urſa minor. See the article URSA.

This is the conſtellation next to the north pole.

CYNOSURUS, dog's-tail graſs, in botany, a genus of plants, whoſe corolla conſiſts of two valves; the exterior concave, longer, and ariſtated; the interior, plane, without any ariſta: the corolla ſurrounds the ſeed, which is ſingle, of an oblong figure, and pointed at each end.

CYON, or CION, among gardeners. See the article CION.

CYPHER, or CIPHER. See CIPHER.

CYPRESS, *Cupreſſus*, the Engliſh name of a genus of trees. See CUPRESSUS.

CYPRINUS, in ichthyology, a very comprehenſive genus of fiſhes of the order of the malacopytergii, the characters of which are theſe: the branchioſtege membrane on each ſide contains three ſmall bones; the mouth is toothleſs, except that towards the orifice of the ſtomach there are two ſerrated bones, which ſerve inſtead of teeth.

This is a very numerous genus, comprehending the roach, tench, carp, gudgeon, barbel, chub, bream, bleak, &c.

CYPRUS, an iſland ſituated in the moſt eaſterly part of the Levant, or Mediterranean ſea, between 33° and 36° eaſt longitude, and between 34° and 36° north latitude.

It is about one hundred and fifty miles long, and ſeventy broad, and is ſubject to the Turks.

Knights of CYPRUS, an order inſtituted by Guy de Luſignan, titular king of Jeruſalem, to whom Richard I. of England, after conquering this iſland, made over his right.

Theſe knights were alſo denominated knights of ſilence, and knights of the ſword.

CYRENAICS, *Cyrenaici*, a ſect of ancient philoſophers, ſo called from their founder, Ariſtippus of Cyrene, a diſciple of Socrates.

The great principle of their doctrine was, that the ſupreme good of man in this life is pleaſure; whereby they not only meant a privation of pain and a tranquillity of mind, but an aſſemblage of all mental and ſenſual pleaſures, particularly the laſt.

CYST, the bag, or tunic, including all incyſted tumours, as the ſcirrhus, atheroma, ſteatoma, meliceres, &c. See the articles SCIRRHUS, ATHEROMA, &c.

If in extracting an incyſted tumour, the including cyſt be broke, or wounded, care muſt be taken to remove it, otherwiſe the tumour will ſpeedily return. See the article *Encyſted* TUMOURS.

Indeed if the tumour be a ſcirrhus, ſarcoma, ſteatoma, or in a glandular part, the contents are hard enough to make a clean extirpation of it, notwithſtanding its including coats be wounded: but when the matter of the tumour is ſoft or fluid, by its eſcaping, the tumour will become flaccid, ſo that it will hardly be poſſible to make a clean extirpation of the cyſt, without leaving ſome fragment behind, which muſt in that caſe be brought away by dreſſing the abſceſs with digeſtives, &c. See ABSCESS.

CYSTIC, a name given to two arteries and two veins, opening into the gall-bladder. The cyſtic arteries, *cyſticæ gemellæ*, are two arteries proceeding from the right branch of the cœliac; and that trunk of the vena porta which goes into the liver affords the cyſtic veins.

CYSTIC DUCT, *Cyſticus Ductus*, a pipe that goes into the neck of the cyſtis, or gall bladder, into which ſome bilious ducts likewiſe open, and through which the greater part of the bile is evidently carried into the cyſtis in human ſubjects.

CYSTIC BILE, one of the two kinds of bile, being diſtinguiſhed into the cyſtic and hepatic bile.

The cyſtic bile is very bitter, thicker, and more coloured than the hepatic.

CYSTIS, in anatomy, the ſame with veſicula, or bladder. See BLADDER and VESICULA.

CYSTIS, in botany, a name anciently given to the alkekengi. See ALKEKENGI.

CYTISO-GENISTA, in botany, the ſame with geniſta. See the article GENISTA.

CYZICENS, *Cyzicena*, a ſort of magnificent banquetting houſes among the ancient Greeks, ſo called from Cyzicus, a city famous for its ſumptuous buildings. The Cyzicens always looked to the north, opened into pleaſant gardens, and were the ſame as the triclinia and cœnacula were at Rome.

CZAR, a title of honour aſſumed by the great dukes, or, as they are now ſtiled, emperors of Ruſſia.

Beckman makes no doubt but they took this title, by corruption, from cæſar, emperor; and accordingly they bear an eagle, as the ſymbol of their empire, and the word CÆSAR in their arms: yet they make a diſtinction between czar and cæſar, the firſt being taken for the king's name, and the other for the emperor's.

The firſt that bore this title was Baſil, the ſon of Baſilides, under whom the Ruſſian power began to appear, about 1470.

PLATE II.

Facing Dai

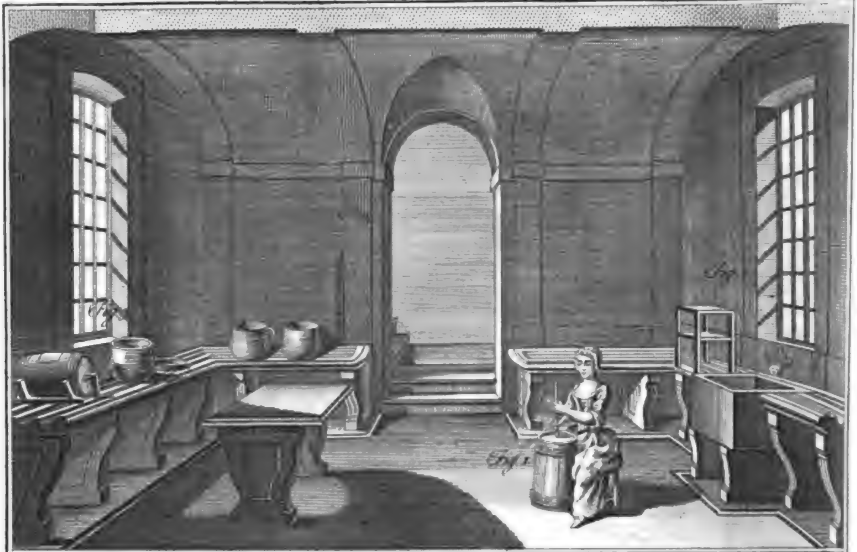


Fig.
Fig.
Fig. 1

Fig. 4

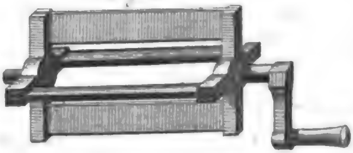


Fig. 10

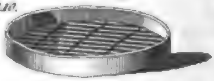


Fig. 8

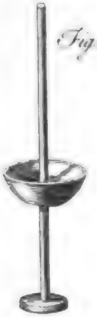


Fig. 11

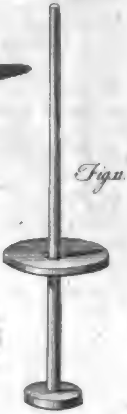


Fig. 5

Fig. 6

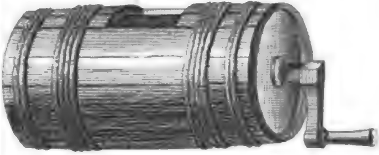


Fig. 7

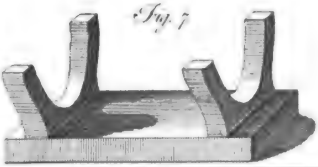


Fig. 9

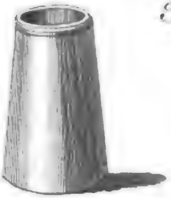
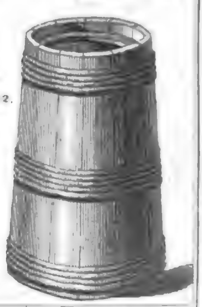


Fig. 12



J. Lodge sculp.

D.

D, One of the letters of the alphabet, the fourth in order, and the third conſonant, anſwering to the Hebrew Daleth, and Greek Delta.

As a numeral, D denotes 500; and with a daſh over it thus, $\bar{D}$, 5000. Uſed as an abbreviation, it has various ſignifications: thus, D ſtands for doctor, as M. D. doctor of medicine; D. T. doctor of theology; D D. implies doctor of divinity, or dono dedit; D. D D. is uſed for dat, dicat, dedicat; and D. D. D. D. for dignum Deo donum dedit.

DABAS, the name of cloths and woollen ſtuffs of the manufacture of Bas, in Languedoc.

DABUIS, a white cotton ſtuff, made in the Eaſt-Indies.

DACE, the Engliſh name of a ſpecies of cyprinus, very common in our rivers: it is longer and more ſlender than the roach, and has ten rays in the fin beſides the anus.

DACTYL, *δακτυλος*, *Dactylus*, in ancient poetry, a metrical foot, conſiſting of one long and two ſhort ſyllables, as *αλκιμος*, and mūrmŭrĕ.

The dactyl and ſpondee are the only feet or meaſures uſed in hexameter verſes; the former being eſteemed more ſprightly, and the latter more ſolemn and grave. Accordingly, where great activity is ſignified, we find the dactyls uſed with much propriety, as in the following verſes of Virgil.

> *Quadrupedante putrem ſonitu quatit ungula campum*; and,
> *Ferte citi ferrum, date tela, ſcandite muros.*

DACTYL, among ancient botaniſts, the ſame with date. See the article DATE.

DACTYLIC VERSES, in ancient poetry, hexameter verſes ending with a dactyl. See DACTYL and HEXAMETER.

DACZAJIE, ſilver money current in Perſia, and worth five mamoudis. See the article MAMOUDI.

DADO, in architecture, the ſame with the dye. See the article DYE.

DADUCHI, in antiquity, prieſts of the goddeſs Ceres, ſo called, becauſe, at the feaſts and ſacrifices of that goddeſs, they ran about the temple, carrying a lighted torch, which they delivered from hand to hand, till it had paſſed through them all. This they did in memory of Ceres's ſearching for her daughter Proſerpine, by the light of a torch, which ſhe kindled in Mount Ætna.

DÆMON, *Δαιμων*, a name given by the ancients to certain ſpirits, or genii, which appeared to men, either to do them ſervice, or to hurt them. The Platoniſts diſtinguiſh between gods, dæmons, and heroes. The gods are thoſe whom Cicero calls *Dii majorum gentium.* The dæmons are thoſe whom we call angels. See ANGEL.

Chriſtians, by the word dæmon, underſtand only evil ſpirits, or devils. Juſtin Martyr ſpeaks of the nature of dæmons, as if he thought them not abſolutely ſpiritual and incorporeal, for which reaſon he attributes ſuch actions to them as cannot be performed without the intervention of a body. It was a fabulous notion among the ancient Hebrews, that Adam begot dæmons and ſpirits on certain ſuccubus's. It is difficult to come at a ſatisfactory account of the dæmonology of that people; and therefore it is no eaſy matter to explain what is meant by the worſhipping of dæmons, or devils, which is the laſt ſpecies of idolatry, according to the diviſion of the rabbins.

The Mahometans allow ſeveral ſorts of dæmons; and the miners of Hungary pretend that, while they are at work in the mines, they often ſee dæmons in the ſhape of little negro boys, doing them no other harm than often extinguiſhing their lights.

DÆMONIAC, a word applied to a perſon ſuppoſed to be poſſeſſed with an evil ſpirit, or dæmon.

DÆMONIACS, in church hiſtory, a branch of the Anabaptiſts, whoſe diſtinguiſhing tenet is, that the devils ſhall be ſaved at the end of the world.

DÆSION, the Macedonian name of the month called by the Athenians antheſterion. See the article ANTHESTERION.

DAFFODIL, the ſame with the narciſſus of botaniſts. See NARCISSUS.

DAFFODIL-LILLY, the lilio-narciſſus of botaniſts. See LILIO-NARCISSUS.

DAHOME, a kingdom of Africa, on the Guinea-coaſt.

DAILY, the ſame with diurnal. See the article DIURNAL.

DAIRY, among farmers, &c. a room or apartment where milk is kept, and manufactured into butter, cheeſe, &c.

The term is formed from *dey*, an old word for milk.

The milk being poured out of the milking-pails into proper veſſels, is there ſuffered to reſt a night or two, according as the weather is more or leſs warm, during which the cream will riſe to the top, and form a thick coat on the ſurface. This muſt be carefully taken off by an utenſil called a ſkimming-diſh, and put into the churn, and there agitated for a conſiderable time: when this agitation has been continued long enough to produce the deſired effect, they open the churn, and with both hands gather it well together, take it out of the butter-milk, and lay it into a very clean bowl, or earthen pan; and if the butter be deſigned to be uſed ſweet, they fill the pan with clear water, and work the butter in it to and fro, till it is brought to a firm conſiſtence of itſelf, without any moiſture. When this has been done, it muſt be ſcotched and ſliced over with the point of a knife, every way as thick as poſſible, in order to fetch out the ſmalleſt hair, mote, bit of rag, ſtrainer, or any thing that may have happened to fall into it: they then ſpread it thin in a bowl, and work it well together with ſuch quantity of ſalt as they think fit; and make it up into diſhes, pounds, half pounds, &c. The newer the butter is, the more wholeſome and pleaſant it is; and that which is made in May is eſteemed the beſt.

Cheeſe is made by curdling the milk with runnet, preſſing out all the ſerum, or whey, by means of a cheeſe-preſs, and laying the cheeſe to dry. See CHEESE.

Explanation of Plate LI.

The upper compartment of the plate is a perſpective view of the inſide of a dairy or milk-houſe.

Fig. 1. A dairy-maid churning.

Fig. 2. Benches, with proper gutters, ciſtern, and a ſtage for making and drying cheeſe.

Fig. 3. Benches, with gutters, veſſels, and a barrel churn, for making butter.

Fig. 4. The arbor of the barrel churn.

Fig. 5. Cover, or bung, of the barrel churn.

Fig. 6. The barrel churn, without its bung.

Fig. 7. Stand of the barrel churn.

Fig. 8. Arbor, or ſtaff, of what is called the Dutch churn.

Fig. 9. Body of the Dutch churn.

Fig. 10. A hoop for cheeſe. It is of different ſizes.

Fig. 11. Arbor, or ſtaff, of the common churn.

Fig. 12. Body of the common churn.

DAISY, in botany. See Bellis.

DALMATIA, a frontier province of Europe, moſtly ſubject to the Turks, but ſome towns on the ſea-coaſt to the Venetians: it is bounded by Boſnia on the north, by Servia on the eaſt, by Albania on the ſouth, and by Morlachia and the gulph of Venice on the weſt.

DAM, among lawyers, ſignifies a boundary or confinement.

Dam, or Dyke. See the article Dyke.

DAMA, the fallow-deer, in zoology, a ſpecies of the deer-kind, diſtinguiſhed by its ramoſe and compreſſed, or palmated horns.

DAMAGE, in law, is generally underſtood of a hurt, or hindrance attending a perſon's eſtate: but, in common law, it is a part of what the jurors are to enquire of in giving verdict for the plaintiff or defendant, in a civil action, whether real or perſonal; for after giving verdict on the principal cauſe, they are likewiſe aſked their conſcience, touching coſts and damages, which contain the hindrances that one party hath ſuffered from the wrong done him by the other. See the article Costs.

DAMARAS, an Indian taffeta, being a kind of armoſin. See Armoisin.

DAMASK, a ſilk ſtuff, with a raiſed pattern, ſo as that the right ſide of the damaſk is that which hath the flowers raiſed or ſattined.

Damaſks ſhould be of dreſſed ſilk, both in warp and woof; and in France, half an ell in breadth: they are made at Chalons in Champagne, and in ſome places in Flanders, as at Tournay, &c. entirely of wool, $\frac{5}{8}$ of an ell wide, and 20 ells long.

Damask is alſo applied to a very fine ſteel, in ſome parts of the Levant, chiefly at Damaſcus in Syria; whence its name.

It is uſed for ſword and cutlaſs-blades, and is finely tempered. See Steel.

DAMASKEENING, or Damasking, the art or operation of beautifying iron, ſteel, &c. by making inciſions therein, and filling them up with gold and ſilver wire; chiefly uſed for adorning ſword-blades, guards and gripes, locks of piſtols, &c.

Damaſkeening partakes of the moſaic, of engraving, and of carving: like the moſaic, it has inlaid work, like engraving, it cuts the metal, repreſenting divers figures; and as in chaſing, gold and ſilver is wrought in relievo. There are two ways of damaſking; the one, which is the fineſt, is when the metal is cut deep with proper inſtruments, and inlaid with gold and ſilver wire: the other is ſuperficial only.

DAMELOPRE, a kind of bilander, uſed in Holland for conveying merchandiſe from one canal to another; being very commodious for paſſing under the bridges.

DAMIANISTS, in church hiſtory, a branch of the ancient Acephali-ſeveritæ. They agreed with the catholics in admitting the IVth council, but diſowned any diſtinctions of perſons in the God-head, and profeſſed one ſingle nature, incapable of any difference; and yet they called God, the Father, Son, and Holy Ghoſt.

DANMINATA Terra, among chemiſts, the ſame with caput mortuum. See the article Caput.

DAMPS, in natural hiſtory, noxious ſteams and exhalations, frequently found in mines, pits, wells, and other ſubterraneous places.

The pernicious damps in mines ſhew abundantly, that nature affords inflammable air in ſome caſes; and we have found by experiments, that art can do the ſame, and that, very probably, on the ſame principles with the natural. Sir James Lowther, having collected the air of ſome of theſe damps in bladders, preſerved it ſo well, that when brought up to London, it would take fire at the flame of a candle, on being let out at the orifice of a piece of tobacco-pipe. It is well known to all that are verſed in chemical experiments, that moſt metals emit a great quantity of ſulphureous vapours, during the effervescence they undergo in the time of their ſolutions, in their reſpective menſtruums: this vapour, being received into bladders, in the ſame manner with the natural air of Sir James Lowther, has been found to take fire, in the like way, on being let out in a ſmall ſtream, and anſwered all the phænomena of the natural kind.

DANAE, in antiquity, a coin ſomewhat more than an obolus, uſed to be put into the mouths of the dead, to pay their paſſage over the river Acheron.

DANCE, an agreeable motion of the body, adjuſted by art to the meaſures or tune of inſtruments, or of the voice.

DANCETTE, in heraldry, is when the outline of any bordure, or ordinary, is indented very largely, the largeneſs of the indentures being the only thing that diſtinguiſhes it from indented. See the article Indented.

DANCHE, in heraldry, the ſame with dantelle, according to Guillim: but Columbier makes it the ſame with indented.

DANEGELT, a tax, or tribute, on every hide of land, impoſed on our anceſtors the Saxons by the Danes, on their frequent invaſions, as the arbitrary terms of peace and departure. It was firſt impoſed as a continual yearly tax upon the whole nation, under king Ethelred. It was levied by William I. and II. but was releaſed by king Henry the Firſt; and finally aboliſhed by king Stephen.

DANK, a piece of ſilver current in Perſia, and ſome parts of Arabia, weighing the ſixteenth part of a drachm. It is alſo a weight uſed by the Arabians to weigh jewels and drugs.

DANTELLE, in heraldry, the ſame with dancette.

DAPHNE, in botany, a genus of plants, the flower of which conſiſts of a ſingle petal; the tube is cylindric, imperforated, and longer than the limb, which is divided into four oval, acute, plane, patent ſegments: the fruit is a roundiſh berry, containing one cell; the ſeed is ſingle, round, and fleſhy.

This plant is a ſtrong cathartic, and too rough to be given with ſafety.

DAPIFER, the dignity or office of grand maſter of a prince's houſhold. This title was given by the emperor of Conſtantinople to the czar of Ruſſia, as a teſtimony of favour. In France the like officer was inſtituted by Charlemaign, under the title of dapiferat; and the dignity of dapifer is ſtill ſubſiſting in Germany, the elector of Bavaria aſſuming the title of arch-dapifer of the empire, whoſe office is, at the coronation of the emperor, to carry the firſt diſh of meat to table, on horſe-back.

DAPPLE BAY, in the manege; when bay horſes have marks of a dark bay, they are called dapple-bays.

DAPPLE-BLACK; when a black horſe has got ſpots or marks more black or ſhining than the reſt of his ſkin, he is called a dapple black.

DARAPTI, among logicians, one of the modes of ſyllogiſms of the third figure, whoſe premiſes are univerſal affirmatives, and the concluſion is a particular affirmative: thus,

Dar- Every body is diviſible;
ap- Every body is a ſubſtance;
ti. Therefore, ſome ſubſtance is diviſible.

DARII, in logic, one of the modes of ſyllogiſms of the firſt figure, wherein the major propoſition is an univerſal affirmative, and the minor and concluſion particular affirmatives: thus,

Da- Every thing that is moved, is moved by another.
ri- Some body is moved:
i. Therefore, ſome body is moved by another.

DARK-CHAMBER. See the article Camera Obscura.

DARNEL, the Engliſh name of the lolium of botaniſts. See the article Lolium.

DART, in aſtronomy, geometry, &c. See the article Sagitta.

DATA, among mathematicians, a term for ſuch things or quantities as are given or known, in order to find other things thereby that are unknown. Euclid uſes the word data, of which he hath a particular tract, for ſuch ſpaces, lines, and angles, as are given in magnitude, or to which we can aſſign others equal.

In algebra, the given quantities, or data, are generally expreſſed by the firſt letters of the alphabet, and the unknown by the laſt letters; thus, if the problem be, From the ſum and product of two quantities given, to find the quantities themſelves, the quantities are repreſented by y and z; and $y+z=a$, the ſum given, and $yz=b$, the product given. See the article EQUATION.

DATA alſo expreſſes, in philoſophy and medicine, any quantity, which for the ſake of a preſent calculation is taken for granted to be ſuch, without requiring an immediate proof for its certainty, called alſo the given quantity, number, or power.

DATE, in law, is the deſcription of the day, month, year of our Lord, and year of the reign of the king, in which a deed or other writing was made. Anciently deeds had no dates but only of the month and year, and now, if in the date of any deed, the year of our Lord is right, though the year of the king's reign be wrong, it ſhall not hurt the ſame.

An antedate is a date prior to the real time when the inſtrument was paſſed.

DATE, *Dactylus*, the fruit of the phœnix, or great palm-tree. See PHOENIX.

DATISI, in logic, a mode of ſyllogiſms in the third figure, wherein the major is an univerſal affirmative, and the minor and concluſion particularly affirmative propoſitions. For example,

DA- All who ſerve God are kings;
TI- Some who ſerve God are poor;
SI. Therefore ſome who are poor are kings.

DATIVE, among grammarians, the third caſe in the declenſion of nouns, expreſſing the relation of a thing to whoſe profit or loſs ſome other thing is referred. It is called dative, becauſe uſually governed by a verb implying ſomething to be given to ſome perſon. In Engliſh, the dative is expreſſed by the ſigns *to* or *for*.

DATURA, thorn-apple, in botany, a genus of plants, the flower of which conſiſts of an infundibuliform petal; the fruit is a ſubovated, bilocular, quadrivalvular, and commonly prickly capſule, fixed to the baſe of the cup; the ſeeds are numerous and reniform.

The thorn-apple is narcotic, and dangerous to be taken internally; but a cataplaſm of its leaves and ſeed is commended for burns.

DAUCUS, the carrot. See the article CARROT.

DAVIDISTS, in church hiſtory, a ſect of Chriſtian heretics in the ſixteenth century; ſo called from David George, their leader, who began by giving out that he was the Meſſiah, and was ſent into the world in order to people the kingdom of Heaven, which was quite empty of inhabitants, for want of virtuous and good men: he rejected marriage, and denied the reſurrection.

DAVIS's QUADRANT. See QUADRANT.

DAVIT, in naval affairs, a long beam of wood thruſt out acroſs from over the ſhip's fore-caſtle to draw up the flooks of the anchor clear from the ſhip's ſide.

The davit is occaſionally ſhifted to project over either ſide of the ſhip's fore-part, or, in the ſea-language, over either bow. Its inner end is ſecured by a ſtrong ring or link of iron, placed in the middle of the fore-caſtle, called the ſpan-ſhackle; and over the outer-end, which has a notch cut round it for that purpoſe, is hung a ſtrong block called the fiſh-block, through which is inſerted a rope called the fiſh-pendant, which being hooked to the flooks of the anchor, immediately draws them up by a tackle or complication of pullies, as ſoon as the anchor is catted. See the article CAT.

DAUPHIN, a title given to the eldeſt ſon of France, and heir preſumptive of the crown, on account of the province of Dauphiny, which, in 1343, was given to Philip of Valois, on this condition, by Humbert, dauphin of the Viennois.

DAY, according to the moſt natural and obvious ſenſe of the word, ſignifies that ſpace of time during which it continues to be light; in contradiſtinction to night, being that partition of time wherein it is dark; but the ſpace of time in which it is light, being ſomewhat vague and indeterminate, the time between the riſing and the ſetting of the ſun is uſually looked on as the day; and the time which lapſes from its ſetting to its riſing again, the night.

The word day is often taken in a large ſenſe, ſo as to include the night alſo; or to denote the time of a whole apparent revolution of the ſun round the earth, in which ſenſe it is called by ſome a natural day, and by others an artificial one: but to avoid confuſion, it is uſual to call it in the former ſenſe ſimply the day, and in the latter a nychthemeron, by which term that acceptation of it is aptly denoted, as it implies both day and night.

The nychthemeron is divided into twenty-four parts, called hours, which are of two ſorts, equal and unequal, or temporary. See the article HOUR.

Different nations begin their day at a different hour: thus the Egyptians began their day at midnight, from whom Hippocrates introduced that way of reckoning into aſtronomy, and Copernicus and others have followed him: but the greateſt part of aſtronomers reckon the day to begin at noon, and ſo count twenty-four hours, till the noon of the next day; and not twice twelve, according to the vulgar computation. The method of beginning the day at midnight prevails alſo in Great Britain, France, Spain, and moſt parts of Europe.

The Babylonians began their day at ſun-riſing, reckoning the hour immediately before its riſing again the twenty-fourth hour of the day, from whence the hours reckoned in this way are called the Babylonic. In ſeveral parts of Germany, they begin their day at ſun-ſetting, and reckon on till it ſets next day, calling that the twenty-fourth hour: theſe are generally termed Italian hours. The Jews alſo began their nychthemeron at ſun-ſetting; but then they divided it into twice twelve hours, as we do; reckoning twelve for the day, be it long or ſhort, and twelve for the night; ſo that their hours continually varying with the day and night, the hours of the day were longer than that of the night, for one half year, and the contrary the other, from whence their hours are called temporary: thoſe at the time of the equinoxes became equal, becauſe then thoſe of the day and night are ſo. The Romans alſo reckoned their hours after this manner, as do the Turks at this day.

This kind of hours are called planetary, becauſe the ſeven planets were anciently looked upon as preſiding over the affairs of the world, and to take it by turns each of theſe hours, according to the following order: Saturn firſt, then Jupiter, Mars, the ſun, Venus, Mercury, and laſt of all the moon: hence they denominated each day of the week from that planet whoſe turn it was to preſide the firſt hour of the nychthemeron. Thus aſſigning the firſt hour of Saturday to Saturn, the ſecond will fall to Jupiter, the third to Mars, and ſo the twenty-ſecond of the ſame nychthemeron will fall to Saturn again, and therefore the twenty-third to Jupiter, and the laſt to Mars: ſo that on the firſt hour of the next day, it will fall to the ſun to preſide; and by the like manner of reckoning, the firſt hour of the next will fall to the moon; of the next, to Mars; of the next, to Mercury; of the next, to Venus: hence the days of the week came to be diſtinguiſhed by the Latin names of *Dies Saturni*, *Solis*, *Lunæ*, *Martis*, *Mercurii*, *Jovis*, and *Veneris*; and among us, by the names of Saturday, Sunday, Monday, &c.

DAYS *of Grace*, are thoſe granted by the court at the prayer of the defendant, or plaintiff, in whoſe delay it is.

DAYS *of Grace*, in commerce, are a cuſtomary number of days allowed for the payment of a bill of exchange, &c. after the ſame becomes due.

Three days of grace are allowed in England; ten in France and Dantzic; eight at Naples; ſix at Venice, Amſterdam, Rotterdam, and Antwerp; four at Frankfort; five at Leipſic; twelve at Hamburg; ſix in Portugal; fourteen in Spain; thirty in Genoa, &c.

DAYS MAN, in the north of England, an arbitrator or perſon choſen to determine an affair in diſpute.

Dog-DAYS, *Dies Caniculares*. See the article CANICULAR *Days*.

Intercalary DAYS. See the article INTERCALARY *Days*.

DAY COAL, among miners, an appellation given to the upper ſtructure of the coal, or that which lies next the ſurface of the earth.

DEACON, διακονος, one of the three ſacred orders of the Chriſtian church. The word is ſometimes uſed in the New Teſtament for any one that miniſters in the ſervice of God, in which ſenſe biſhops and preſbyters are ſtiled deacons; but in its reſtrained ſenſe, it is taken for the third order of the clergy, as appears from the concurrent teſtimony of ancient writers, who conſtantly ſtile them miniſters of the myſteries of Chriſt, miniſters of epiſcopacy and the church, and the like. The firſt inſtitution of this order is recorded in Acts, chap. vi.

DEACONESS, *a Female Deacon*, an order of women, who had their diſtinct offices and ſervices in the primitive church.

DEAD, in general, ſomething void or deprived of life. See DEATH.

DEAD-EYES, in naval affairs, certain blocks with three holes in them, whereby to draw tight the ſhrouds and ſtays of a ſhip.

In order to form the purchaſe which tightens the ſhrouds, &c. there are always two of theſe dead-eyes placed at ſmall diſtances from each other, one in the end of the ſhroud, and the other to the ſhip's ſide, by a ſtrop or link of iron encompaſſing the edge of it; then a ſmaller rope, called the lanyard, is paſſed alternately through the holes in the upper and lower dead-eyes, and drawn tight by the application of a tackle. See CHANNEL and CHAINS.

The dead-eyes uſed for the ſtays have only one hole in them, and are more uſually termed hearts.

There are likewiſe dead-eyes of another form uſed for the crow-feet: theſe are long, inclining to round, and tapering to one end. See CROW-FEET.

DEAD-LIGHT, amongſt ſeamen, a ſort of ſtrong wooden poſts, made exactly to fit the cabin-windows: they are always fixed in on any expectation of a ſtorm, and the glaſs windows taken out, which might otherwiſe be ſhattered to pieces by the ſea, and let great quantities of water pour into the ſhip.

DEAD NETTLE, a genus of plants called by botaniſts lamium. See LAMIUM.

DEAD-PLEDGE, the ſame with mortgage. See MORTGAGE.

DEAD-RECKONING, in navigation, the judgment or eſtimation which is made of the place where a ſhip is, without any obſervation of the heavenly bodies; and is performed by keeping an account of her way by the log, in knowing the courſe they have ſteered by the compaſs, and by rectifying all the allowances for drift, lee-way, &c. according to the ſhip's known trim. This reckoning, however, is always to be corrected as often as any good obſervation can be obtained.

DEAD RISING, or **RISING-FLOOR**, in ſhip-building, thoſe parts of a ſhip's floor afore and abaft, where it begins to riſe and grow narrower as it approaches the ſtem and ſtern-poſt.

DEAD-TOPS, a diſeaſe incident to young trees, and cured by cutting off the dead parts cloſe to the next good twig or ſhoot, claying them over as in grafting. See the article GRAFTING.

DEAD WATER, in the ſea language, the eddy of water which cloſes in with a ſhip's ſtern, as ſhe ſails through it.

DEADLY-CARROT, a plant called by botaniſts thapſia. See the article THAPSIA.

DEADLY-NIGHTSHADE, a name given to the belladonna of botaniſts. See the article BELLADONNA.

DEAFFORESTED, a term found in law-books, ſignifying that a place is diſcharged from being a foreſt, or freed from the foreſt-laws.

DEAFNESS, the ſtate of a perſon who either wants the ſenſe of hearing, or has it greatly impaired.

The cauſes of deafneſs are a cutting off the external ear, or an obſtruction of the auditory paſſage, from wax, or other things; from a rupture of the membrane of the tympanum, or when it is corroded, or ulcerated, or the auditory nerve is obſtructed or compreſſed. External cauſes are falls from high places; exceſſive noiſe, ſuch as the exploſion of cannon; likewiſe acute diſeaſes near their ſtate, which are like to terminate by a critical hæmorrhage.

With regard to the cure, if the obſtruction be in the external cavity of the ear, it is diſcernible by the ſight. If there is occaſion to ſyringe the ear, a decoction of ſage and roſemary-flowers will be proper, with equal parts of water and white-wine: but great caution ſhould be uſed.

Hoffman ſays, deafneſs ſometimes ariſes from a ſlackneſs of the auditory nerves, which often happens from too great a humidity, which, if neglected, will terminate in a perpetual and incurable deafneſs, and may be diſperſed, if taken in time, by proper cephalics and ſudorifics.

Heiſter informs us, that medicinal waters drank in the ſummer-time pretty largely, are the beſt means as preſervatives, and for curing diſorders of the ears; and that they often perform more than any other remedies whatever.

DEAL, a thin kind of fir-planks, of great uſe in carpentry: they are formed by ſawing the trunk of a tree into a great many longitudinal diviſions, of more or leſs thickneſs, according to the purpoſes they are intended to ſerve.

Deals are rendered much harder, by throwing them into ſalt-water as ſoon as they are ſawed, keeping them there three or four days, and afterwards drying them in the air or ſun; but neither this nor any other method yet known, will preſerve them from ſhrinking.

DEAN, an eccleſiaſtical dignitary in cathedral and collegiate churches, and head of the chapter.

As there are two foundations of cathedral churches in England, the old and the new, ſo there are two ways of creating deans. Thoſe of the old foundation, founded before the ſuppreſſion of monaſteries, as the deans of St. Paul's, York, &c. are raiſed to that dignity much after the manner of biſhops, the king firſt ſending his congé d'elire, the chapter electing, and the king granting his royal aſſent, the biſhop confirms him, and gives his mandate to inſtal him. Thoſe of the new foundation, whoſe deanries were raiſed upon the ruins of priories and convents, ſuch as the deans of Canterbury, Durham, Ely, Norwich, Wincheſter, &c. are donative, and inſtalled by virtue of the king's letters patent, without either election or confirmation. Canoniſts diſtinguiſh between deans of cathedral and thoſe of collegiate churches. The firſt, with their chapter, are regularly ſubject to the juriſdiction of the biſhop. As to the latter, they have uſually the contentious juriſdiction in themſelves, though ſometimes this belongs to them in common with the chapter. There are cathedral churches which never had a dean, and in which the biſhop is head of the chapter, and in his abſence, the archdeacon: ſuch are the cathedrals of St. David and Landaff. There are alſo deans without a chapter, as the dean of Battle in Suſſex, dean of the arches, &c. and deans without a juriſdiction, as the dean of the chapel royal. In this ſenſe the word is applied to the chief of certain peculiar churches or chapels.

Rural **DEAN**, called alſo archpreſbyter, originally exerciſed juriſdiction over ten churches in the country, and afterwards became only the biſhop's ſubſtitute, to grant letters of adminiſtration, probate of wills, &c. to convocate the clergy, and ſignify to them ſometimes by letters, the biſhop's will, and to give induction for the archdeacon. Their office is now loſt in that of the archdeacons and chancellors.

DEAN *of a Monaſtery*, was a ſuperior eſtabliſhed under the abbot, to eaſe him in taking care of ten monks; whence he was called decanus.

DEAN and CHAPTER, are the biſhop's council to aſſiſt him in the affairs of religion, and to aſſent to every grant which the biſhop ſhall make to bind his ſucceſſors. As a deanry is a ſpiritual dignity, a man cannot be a dean and prebendary of the ſame church.

DEARTICULATION, the ſame with diarthroſis. See the article DIARTHROSIS.

DEATH, *Mors*, is generally conſidered as the ſeparation of the ſoul from the body; in which ſenſe it ſtands oppoſed to life, which conſiſts in the union thereof.

In law, there is a natural death and a civil death: natural, where nature itſelf expires; civil, where a perſon is not actually dead, but adjudged ſo by law. Thus, if any perſon, for whoſe life an eſtate is granted, remains beyond ſea, or is otherwiſe abſent ſeven years, and no proof made of his being living, he ſhall be accounted naturally dead.

DEATH-WATCH, in zoology, an inſect nearly of the ſize of the common louſe, frequent among old wood, furniture, &c. It is of an oblong and flattiſh figure, and of a pale browniſh white colour; and the noiſe, reſembling the beating of a watch, is the love note of theſe animals, when the male or female woo each other.

DE BENE ESSE, a Latin phraſe uſed in our law in a doubtful meaning, as to take or do a thing *de bene eſſe*, is to allow it at preſent to be well done; but when it comes to be more fully examined, then to ſtand or fall according to the merit of the thing.

DEBENTURE, a term of trade uſed at the cuſtom-houſe for a kind of certificate ſigned by the officers of the cuſtoms, which intitles a merchant exporting goods to the receipt of a bounty or drawback.

DEBENTURE, in ſome of the acts of parliament, denotes a kind of bond or bill firſt given in 1649, whereby the government is charged to pay the ſoldier creditor, or his aſſigns, the money due on auditing the account of his arrears.

DEBENTURE is likewiſe uſed in the exchequer, and given to the king's ſervants for the payment of their wages.

DEBET, among merchants, ſignifies the ſums due to them for goods ſold on credit, for which they have charged their journal or ledger. It is more particularly underſtood of the remainder of debts, part of which has been paid on account.

DEBET, among book-keepers, is uſed to expreſs the left hand page of the ledger, to which are carried all articles ſupplied or paid on the ſubject of an account.

DEBILITY, among phyſicians, a relaxation of the ſolids, occaſioning oftentimes weakneſſes and faintings.

DEBRUIZED, in heraldry, a term peculiar to the Engliſh, by which is intimated the grievous reſtraint of any animal, debarred of its natural freedom, by any of the ordinaries being laid over it.

DEBT, *Debitum*, in law, any thing due to another, whether it be money, goods, or ſervices; or the action brought for recovering the ſame.

DEBTOR, a perſon who owes any thing to another, in contradiſtinction to creditor, which is he to whom the debt is owing.

DEBTOR, in merchant's accounts. See BOOK-KEEPING.

DECACHORDON, in antiquity, a muſical inſtrument with ten ſtrings, called by the Hebrews, haſur, being almoſt the ſame as our harp, of a triangular figure, with an hollow belly, and ſounding from the lower part.

DECAGON, a plane figure in geometry, having ten ſides and ten angles; and if all the ſides are equal, and all the angles, it is called a regular decagon, and may be inſcribed in a circle.

The word is formed from the Greek, δεκα, ten, and γωνια, an angle.

The ſides of a regular decagon are, in power and length, equal to the greateſt ſegment of an hexagon inſcribed in the ſame circle, and cut in extreme and mean proportion.

If A B (plate XLVII. *fig.* 13.) be the ſide of a regular decagon inſcribed in a circle, and it be continued out to C, ſo that BC=AD, then will AB : BC :: BC : AC.

Let r be the radius of the circle, and put $AB=x$, then becauſe $AB\times AC=BC^2$, we have $x\times\overline{r+x}=rr$; hence, by compleating the ſquare, &c. we get $x=\overline{\sqrt{\tfrac{5}{4}}-\tfrac{1}{2}}\times r$, the ſide of a decagon inſcribed in that circle.

DECALOGUE, the ten precepts or commandments delivered by God to Moſes, after engraving them on two tables of ſtone.

The word is Greek, δεκαλογος, and compounded of δεκα, ten, and λογος, a word.

The Jews, by way of excellence, call theſe commandments the ten words, from whence they had afterwards the name of decalogue.

The Talmudiſts, and after them Poſtellus, pretended that the decalogue was written, or engraved, in letters of light, that is luminous, ſhining letters, and that the engraving went quite through the tables.

The church of Rome has ſtruck the ſecond commandment quite out of the decalogue, and to make their number complete, hath ſplit the tenth into two. The reaſon of which may be eaſily conceived.

DECAMPING, in military affairs, is the marching of an army from the ground where it before lay encamped. See CAMP.

DECANDRIA, in the Linnæan ſyſtem of botany, a claſs of plants, the great characteriſtic of which is, that they have hermaphrodite flowers, with ten ſtamina in each.

DECANTATION, among chemiſts, &c. the gently pouring off a liquor from its fæces, by inclining the lip or canthus of the veſſel; whence the name.

DECANUS, in Roman antiquity, an officer who preſided over ten other officers, and was head of the contubernium, or ſerjeant of a file of ſoldiers.

DECAPITÉ, or DEFFAIT, in heraldry. See the article DEFFAIT.

DECASTYLE, in the ancient architecture, a building with an ordonance of ten columns in front, as the temple of Jupiter Olympius was.

DECEIT, *Dolus*, in law, a ſubtle trick, or device, to which may be added all manner of craft and colluſion, or underhand practice, uſed to defraud another, by any means whatever.

DECEMBER, in chronology, the laſt month of the year, conſiſting of thirty-one days, and ſo called as being the tenth month in the Roman year, which commenced with March. See the articles YEAR and MONTH.

DECEMVIRI, in Roman antiquity, ten magiſtrates choſen annually at Rome, to govern the commonwealth inſtead of conſuls, with an abſolute power to draw up and make laws for the people.

There were alſo other decemviri, created on frequent emergencies, to manage and regulate certain affairs, as conducting colonies, preſiding at feaſts, taking care of ſacrifices, keeping the ſybils books, &c.

DECENNALIA, ancient Roman feſtivals celebrated by the emperors, every tenth year of their reign, with ſacrifices, games, and largeſſes for the people.

DECENNIERS, DECINERS, or DOZINERS, in our ancient law, ſuch as had the overſight of ten Friburghs, for the maintenance of the king's peace, the limits of whoſe juriſdiction was called decenna.

DECIDUOUS, an appellation chiefly uſed in reſpect to plants: thus, the calyx or cup of a flower is ſaid to be deciduous, when it falls along with the flower-petals; and, on the contrary, it is called permanent, when it remains after they are fallen. Again, deciduous leaves are thoſe which fall in autumn, in contradiſtinction to thoſe of the ever-greens, which remain all the winter.

DECIL, in aſtronomy, an aſpect or poſition of two planets, when they are diſtant from each other a tenth part of the zodiac.

DECIMAL ARITHMETIC, the art of computing by decimal fractions, firſt invented by Johannes Regiomontanus, and uſed by him in the conſtruction of his tables of ſines.

DECIMAL FRACTIONS are thoſe whoſe denominator is 1, with one or more cyphers; as, 10, 100, 1000, 10000, &c. Thus, $\frac{5}{10}$, $\frac{6}{100}$, $\frac{7}{1000}$, &c. are decimal fractions.

In the writing of decimal fractions we uſually omit the denominator, as only conſiſting of unity with cyphers annexed; and in lieu thereof, a point, or comma, is prefixed to the numerator. Thus, $\frac{5}{10}$ is written ,5; $\frac{46}{100}$, .46. So .125 expreſſes an hundred twenty-five parts of any thing ſuppoſed to be divided into 1000 parts.

As cyphers on the right hand of integers increaſe their value decimally; as, 2, 20, 200, &c. ſo when ſet on the left-hand of decimal fractions, they decreaſe the value decimally; as, 5, 05, 005, &c. When ſet on the left hand of integers, or on the right-hand of decimals, they ſignify nothing, but only to fill up places: thus, .5000 or 0005 is but five tenths, or five units.

To reduce any vulgar fraction, as ſuppoſe $\frac{5}{8}$, to a decimal fraction of the ſame value, whoſe denominator ſhall be 1000; ſay, by the Rule of Three, As 8, the denominator of the vulgar fraction, is to 5 the numerator; ſo will 1000, the denominator aſſigned, be to a 4th term, which, by working, will be found to be .625; and therefore $\frac{625}{1000}$, or .625, is a decimal of the ſame value with the former fraction $\frac{5}{8}$.

The common operations in decimals are performed as in the vulgar rules, regard being had only to the particular notation, to diſtinguiſh the integral from the fractional part of a ſum.

In addition and ſubtraction of decimals, the points being all placed under each other, the figures are to be added, and ſubtracted, as in common arithmetic; and when the operation is done, ſo many figures of the ſum, or remainder, are to be noted for decimals, as there are places of decimals in the greateſt given numbers.—An example will make this clear.

```
Addition of Decimals.   ||    Subtraction.
                        ||
  ,44256 | 24,421       ||  From 67,9
  ,439   | 15,024       ||  Take 24,876
  ,745   |  3,712       ||  ---------------
  ,031   | 12,531       ||  Rem. 43,024
  ,10    |  7,2         ||  ===============
  ,4     | ------       ||  From 25,1462
 ------- | 62,888       ||  Take 13,07
 2,15756 |              ||       -------
                        ||       12,0762
```

For multiplication of decimals, obſerve to cut off juſt ſo many decimal parts from the product as there are decimals in both factors. The work is the ſame as in integers. Thus,

```
        Multiplication of Decimals.

     ,1472 |    ,365 |  3,650
      ,175 |    ,122 |    621
  ---------|---------|---------
      7360 |     730 |   3650
    10304  |    730  |  7300
    1472   |   365   | 21900
  ---------|---------|---------
  ,0257600 | ,044530 | 2266,650
```

Note, In the firſt and ſecond examples the products only amount to ſix and five places; for this reaſon cyphers are prefixed to make up the numbers of decimal places in the two factors reſpectively.

In diviſion of decimals, proceed in all reſpects as in dividing of integers, and, when the operation is finiſhed, mark as many places in the quotient for decimals, as, with the number of decimals in the diviſor, are equal to the decimal places of the dividend.

```
.22) .8030 (365        |    22) 8.030 (.365
     66                |        66
     ---               |        ---
     143               |        143
     132               |        132
     ----              |        ----
     .110              |        .110
      110              |         110
      ---              |         ---
      ...              |         ..0

22) .8030 (.0365       |  73.2) 83.219 (1.13
    66                 |        732
    ---                |        ----
    143                |        1001
    132                |         732
    ----               |        -----
    .110               |        .2699
     110               |         2196
     ---               |        -----
     ...               |         .503
```

There are, however, certain caſes in diviſion of decimals which require ſome farther management: as, firſt, where the diviſor is a decimal fraction, and the dividend is an integer; add, or annex, as many or rather more cyphers to the dividend than there are places in the diviſor: thus, .365) 22.0000 (60.2. For there being three places of decimals in the diviſor, and four in the dividend, there will be but one in the quotient. Secondly, Where the diviſor is a mixed number, and the dividend a whole number, add at leaſt as many cyphers to the dividend, as there are places in the diviſor: Thus, 3.65)22.0000(.602.

DECIMATION, a puniſhment inflicted by the Romans on ſuch ſoldiers as quitted their poſt, or behaved themſelves cowardly in the field. The names of all the guilty were put into an urn or helmet, and as many were drawn out as made the tenth part of the whole number, and theſe were put to the ſword, and the others ſaved.

DECIPHERING, the art of finding the alphabet of a cipher. See CIPHER.

Every language has, beſides the form of its characters, ſomething peculiar in the place, order, combination, frequency, and number of the letters; to all which particular regard is to be had in deciphering. In all languages, however, the following rules ought to be obſerved: 1. One word is to be compared with another, that their reſemblance and difference may be known. 2. No word can be without a vowel. 3. A word of one letter is always a vowel, or a conſonant with an apoſtrophe. 4. The vowels recur much more frequently than the conſonants. 5. Double vowels may be at the beginning of a word, but not double conſonants. 6. Double characters at the beginning of a word are always vowels. 7. Short words of two or three letters have one or two conſonants. 8. The vowels are therefore moſt eaſily learned from the ſhort words, which are to be firſt conſidered by the decipherer. 9. If double characters are preceded by a ſingle letter, the letter is a vowel. 10. In languages abounding with diphthongs, one vowel is often joined with another. 11. The letter that precedes or follows double conſonants is, if a conſonant, always one of the liquids, *l*, *m*, *n*, *r*. 12. If two different characters occur, of which the latter is often conjoined with various letters, and the former is never found either by itſelf, or followed by any other letter, thoſe two are *qu*. 13. Theſe letters *qu* are always followed by a vowel. 14. One vowel recurs more frequently than another, as do the conſonants, according to the language, &c.

DECKS, in ſhip-building, the planked floors on which the guns reſt and the men walk: they are ſupported by the beams, and by two rows of ſmall pillars called ſtanchions, ſituated at proper diſtances from each other for the whole length of the ſhip. Firſt and ſecond rate ſhips, and the largeſt order of the third rate, are furniſhed with three decks, diſtinguiſhed by the names of the upper, middle, and lower-decks, the laſt of which is however commonly termed, abſurdly enough, the gun deck: beſides theſe three, there is the quarter-deck and fore-caſtle, which are on the ſame line, but are at ſome diſtance from each other, leaving a vacancy in the middle, which is called the waiſt. Above the hinder or aftmoſt part of the quarter-deck there is yet another deck, called the poop, which extends nearly over half of the quarter-deck, and forms a roof for the captain's cabbin, which is called the coach.

Fluſh-DECK, or a DECK *fluſh fore and aft*, is one laid from ſtem to ſtern, with one floor, without any heights or hollows, only the gradual riſing of the floor from the middle towards the two ends.

DECLAMATION, a ſpeech made in public, in the tone and manner of an oration, uniting the expreſſion of action to the propriety of pronunciation, in order to give the ſentiment its full impreſſion upon the mind.

DECLARATION, in law, is a formal ſhewing in writing the ground of complaint of the plaintiff, in an action againſt the defendant, where the plaintiff is ſuppoſed to have received ſome injury.

DECLENSION, in grammar, an inflexion of nouns according to their divers caſes, as nominative, genitive, dative, &c. It is a different thing in the modern languages, which have not properly any caſes, from what it is in the ancient Greek and Latin. With reſpect to languages, where the nouns admit of changes, either in the beginning, the middle, or ending, declenſion is properly the expreſſion of all thoſe changes in a certain order, and by certain degrees called caſes. With regard to languages, where the nouns do not admit of changes in the ſame number, declenſion is the expreſſion of the different ſtates a noun is in, and the different relations it has; which difference of relations is marked by particles, and called articles, as *a*, *the*, *of*, *to*, *from*, *by*, &c. See ARTICLE.

DECLINATION, in aſtronomy, is the diſtance of any celeſtial object, or point in the heavens, from the celeſtial equinoctial, either north or ſouth, in degrees, minutes, &c. meaſured on a meridian, or circle of declination.

Thus E Q (plate LII. *fig.* 1.) repreſents the celeſtial equinoctial, P the north pole, S the ſouth; the declination of the ſtar A is the arch A E, north; and the arch H E, the declination of the ſtar H, ſouth.

The greateſt declination of the ſun, or of the ecliptic, was firſt, as we know of, obſerved by Pytheas, at Maſtilia, about 324 years before Chriſt; who, obſerving that the height of a gnomon was to its ſhadow, when the ſun was in the meridian, as 31951½ to 90000, from thence concluded the ſun's greateſt declination to be 23 deg. 52 min. 41 ſec. And Gaſſendus found the ſolſtitial ſhadow of the ſame length as it had been obſerved by Pytheas, near 2000 years before: and ſo he concluded that the ſun's greateſt declination is conſtant. But from a compariſon of the ſeveral obſervations concerning this matter, the ſun's greateſt declination is commonly accounted 23 deg. 30 min.

Declination *of the Sea-Compaſs*, or *Needle*, is its variation from the true meridian of any place.

Declination *of a Wall*, or *Plane for Dials*, is an arch of the horizon, contained either between the plane and the prime vertical circle, if you reckon it from the eaſt or weſt; or elſe between the meridian and the plane, if you account it from the north or ſouth.

DECLINATORIES, are inſtruments for taking the declinations, inclinations, and reclinations of planes; and they are of ſeveral kinds.

The beſt ſort for taking the declination conſiſts of a ſquare piece of braſs, or wood, with a limb accurately divided into degrees, and every fifth minute, if poſſible, having a horizontal dial moving on the center, made for the latitude of the place it is to ſerve in, and which has a ſmall bit of fine braſs fixed on its meridian line, like a fiducial edge, to cut the degrees of the limb; for at any time when the ſun ſhines, by having the hour of the day, you may find the declination of any wall or plane by this inſtrument.

DECLINING Dials, are thoſe whoſe planes ſtand perpendicularly to the horizon, and decline, that is, do not face directly the four cardinal points. See the article Dial.

DECLIVIS, in anatomy, a muſcle otherwiſe called obliquus deſcendens. See the article Obliquus.

DECLIVITY denotes juſt the reverſe of acclivity. See Acclivity.

DECOCTION, in pharmacy, the boiling ſimples, or other drugs, in order to extract their virtues for ſome medicinal purpoſe. The general ſubjects of decoction are animals and vegetables, and ſometimes minerals, as antimony and quickſilver. The liquors which ſerve to boil them, are water, wine, vinegar, milk, and whey.

DECOMPOSITE Leaf, one whoſe petiole is twice divided before it gives riſe to the leaf.

DECOMPOSITION, in chemiſtry and pharmacy, the reduction of a body into its principles or component parts. See the article Analysis.

DECORATION, in architecture, is uſed for whatever adorns a building, either without-ſide or within. The orders of architecture contribute a great deal to the decoration; but then the ſeveral parts of theſe orders muſt have their juſt proportion, characters, and ornaments, otherwiſe the fineſt order will bring confuſion rather than richneſs.

DECORTICATION, the ſame with barking of trees. See Barking.

DECORUM, in architecture, is the ſuitableneſs of a building, and the ſeveral parts and ornaments thereof, to the ſtation and occaſion.

DECOUPLE, in heraldry, the ſame as uncoupled: thus, a chevron decouple, is a chevron wanting ſo much of it towards the point, that the two ends ſtand at a diſtance from one another, being parted and uncoupled.

DECOY. In a naval chace, it is uſual for ſmall ſhips of war to diſguiſe themſelves in ſuch a manner by painting, as to be miſtaken for merchantmen, or ſhips of the enemy, in order to deceive and provoke the adverſary to chaſe, at which time they are careful, by altering the trim of the ſhip, which is eaſily done, to prevent her from ſailing faſt, although at the ſame time they have a great ſail abroad, and appear extremely anxious to eſcape.

Decoy, a place made for catching wild fowl. Hence,

Decoy-Duck is a duck that flies abroad, and lights into company of wild ones, which by her allurements ſhe draws into the decoy.

DECREE, an order made by a ſuperior power for the regulation of an inferior.

Decree, in the civil law, is a determination that the emperor pronounces upon hearing a particular cauſe between the plaintiff and defendant.

Decrees *of Councils*, are the laws made by them, to regulate the doctrine and policy of the church.

Decrees *in Chancery*, are the determinations of the lord-chancellor, upon a full hearing of the merits of a cauſe.

DECREET, in the law of Scotland, a final decree or judgment of the lords of ſeſſion, from which an appeal only lies to parliament.

DECREMENT, in heraldry, ſignifies the wane of the moon from the full to the new.

DECREPITATION, in chemiſtry, the act of calcining ſalt over the fire, till it ceaſe to crackle. The deſign of this is to free the ſalt from ſuperfluous moiſture: but as it is thereby rendered porous, and apt to imbibe the humidity of the air, it muſt always be kept very cloſe afterwards, leſt the air ſhould moiſten it a-new.

Decrepitation is alſo applied to the crackling of the ſalts during the operation.

DECRETAL, in the canon-law, a letter of a pope, determining ſome point or queſtion in the eccleſiaſtical law. The decretals compoſe the ſecond part of the canon-law.

DECUPLE Proportion, that of ten to one. See the article Proportion.

DECURIO, in Roman antiquity, a commander of ten men in the army, or the chief of a decury.

DECURRENT Leaf, one which adheres immediately to the ſtalk of a plant, without any pedicle, and which has its lower part extended, and running a little way along the branch.

DECURY, ten perſons ranged under one chief, or leader, called the decurio.

DECUSSATION, a term in geometry, optics, and anatomy, ſignifying the croſſing of any two lines, rays, or nerves, when they meet in a point, and then go on ſeparately from one another.

DECUSSORIUM, a ſurgeon's inſtrument, which, by preſſing gently on the dura mater, cauſes an evacuation of the pus collected between the cranium and the before-mentioned membrane, through the perforation made by the trepan.

DEDICATION, a ſolemn devoting, or ſetting apart, any perſon or thing, to the ſervice of God, and the purpoſes of religion.

Feaſt of **Dedication**, an anniverſary feſtival among the Jews, in memory of Judas Maccabæus, who repaired and dedicated a new temple and altar, which had been plundered and profaned by Antiochus Epiphanes. It was obſerved on the twenty-fifth of Ciſleu, and continued eight days.

The Feaſt of **Dedication**, or rather the feaſt of a ſaint, or patron of a church, called in our law-books *dedicare*, was celebrated not only by the inhabitants of the place, but by thoſe of all the neighbouring villages, who reſorted thither; and ſuch aſſemblies were authoriſed by the king. The cuſtom is ſtill retained in ſome places, under the name of wakes, or vigils.

Dedication, in matters of literature, the inſcribing a book, poem, play, or the like, to ſome perſon of diſtinction, ſerving both as a protection and honour to them, and a mark of the author's reſpect for the perſon to whom he dedicates his work.

DEDUCTION, in commerce, a ſubtracting or retrenching a little ſum paid, from a greater remaining yet unpaid.

DEDUTTIONE, in muſic, a name given to the riſing of the voice, in pronouncing the ſyllables *ut*, *re*, *mi*, *fa*, *ſol*, *la*; *quia per has deducitur vox*; in contradiſtinction

tion to reductio, when the voice deſcends by theſe, *la, ſol, fa, mi, re, ut*; *quia per has reducitur vox.*

DEED, an inſtrument written on paper or parchment, comprehending ſome contract, bargain, or agreement, between the parties thereto, in relation to the matter therein contained.

The validity of a deed conſiſts in three principal things, viz. writing, ſealing, and delivery. There are two kinds of deeds, viz. deeds indented, and deeds poll; which names chiefly import the ſhape of them, the one being cut in and out at top, and the other plain.

DEER, *Cervus*, in zoology. See the article CERVUS.

DEER-HAYS, large nets, made of cords, to catch deer. Whoever keeps them, except in his own park, forfeits forty ſhillings a month.

DEER STEALERS are puniſhable by various laws and ſtatutes, made from time to time. Any offender convicted of deer-ſtealing, before a judge of gaol-delivery, may be tranſported by 5 Geo. I. cap xxviii. And it is felony for perſons to appear armed and diſguiſed in a foreſt or park, and hunt or kill the deer, by 6 Geo. I. cap. xxii.

DE FACTO, ſomething actually in fact, or exiſting, in contradiſtinction to de jure, where a thing is only ſo in juſtice, but not in fact: as a king de facto is a perſon that is in actual poſſeſſion of a crown, but has no legal right to the ſame; and a king de jure is the perſon who has a juſt right to the crown, though he is out of poſſeſſion thereof.

DEFAMATION, the ſpeaking ſlanderous words of another; for which the ſlanderer is puniſhable, according to the nature of his offence, either by action upon the caſe at common law, or by ſtatute, or in the eccleſiaſtical court. No damages are given in the eccleſiaſtical court, but the puniſhment of the party is by way of penance.

DEFAULT, in law, is generally taken for non-appearance in court, at a day aſſigned; but imports any omiſſion of that which we ought to do, for which judgment may be given againſt the defaulter. In the uſual ſenſe, if the plaintiff in a ſuit make default in appearance on a trial, he will be non-ſuited; and where a defendant makes default, judgment ſhall be had againſt him by default. Jurors making default in their appearance, are to loſe and forfeit iſſues.

DEFECTIVE, in general, an appellation given to things which want ſome of the properties that naturally they ought to have. Thus,

DEFECTIVE NOUNS are thoſe which want one of the numbers, or one or more caſes. See the article NOUN.

DEFECTIVE THIRD, among muſicians, the ſame with diminiſhed third. See the article DIMINISHED.

DEFEISANCE, or DEFEASANCE, in our law, a condition relating to ſome certain deed, which being performed, the deed is defeated and rendered void, as if it had never been made.

DEFENCE, in fortification, all ſorts of work that cover and defend the oppoſite poſts; as flanks, caſements, parapets, and fauſſebrays.

It is almoſt impoſſible to fix the miner to the face of a baſtion, till the defences of the oppoſite one are ruined, that is, till the parapet of its flank is beaten down, and the cannon, in all parts that can fire upon that face which is attacked, are diſmounted.

Line of DEFENCE, a ſuppoſed line drawn from the angle of the curtain, or from any other part in the curtain, to the flanked angle of the oppoſite baſtion. See the articles CURTAIN and BASTION.

A line of defence repreſents the flight of a muſket-ball from the place where the muſketeers ſtand, to ſcour the face of the baſtion, and ought never to exceed the reach of a muſket. It is either fichant or razant; the firſt is when it is drawn from the angle of the curtain to the flanked angle: the laſt, when it is drawn from a point in the curtain, razing the face of the baſtion.

DEFENCE, in law, ſignifies a plea, or what the defendant ought to make after the plaintiff's count, or declaration, viz. that he defends all the wrong, force, and damages, where and when he ought, &c.

DEFENCES, in heraldry, are the weapons of any beaſt, as the horns of a ſtag, the tuſks of a wild boar, &c.

DEFENDANT, in law, the perſon ſued in an action perſonal; as tenant is he who is ſued in an action real. See ACTION.

DEFENDER *of the Faith*, a peculiar title, belonging to the king of Great Britain, as Catholic does to the king of Spain, Chriſtian to the king of France, &c.

This title was firſt given by pope Leo X. to king Henry VIII. for writing againſt Luther.

DEFENSITIVE, in ſurgery, ſignifies a bondage, plaſter, &c. to defend any part from external injuries.

DEFERENT, in anatomy, a term applied to certain veſſels in the body, that ſerve for the conveyance of humours from one part to another. See DEFERENTIA VASA.

DEFERENT, in the Ptolemaic aſtronomy, a circle invented to account for the eccentricity, perigee, and apogee of the planets.

DEFERENTIA VASA, two white, ſolid, flatted tubes, one lying on the right ſide, the other on the left, from the epididymis, of which they are continuations: each of them runs up in the cellular vagina of the ſpermatic veſſels, as high as the openings in the abdominal muſcles; the blood veſſels lying forward, and the vas deferens behind them.

Their uſe is to carry the ſemen from the epididymes to the veſiculæ ſeminales; and, in the coitus, to diſcharge it into the urethra.

DEFICIENT, in general, ſignifies much the ſame with defective. See DEFECTIVE.

DEFICIENT HYPERBOLA, one with only one aſymptote, and two hyperbolical legs running out infinitely towards the aſymptote, but contrary ways. See the article HYPERBOLA.

DEFICIENT INTERVAL, in muſic, one leſs by a comma than it ought to be. See COMMA and INTERVAL.

DEFICIENT NUMBERS, thoſe whoſe parts or multiples, added together, fall ſhort of the integer, whereof they are the parts; ſuch is 8, its parts, 1, 2, 4, making only 7. See the article NUMBER.

DEFILE, in fortification, a ſtraight narrow paſſage, through which a company of horſe or foot can paſs only in file, by making a ſmall front; ſo that the enemy may take an opportunity to ſtop their march, and to charge them with ſo much the more advantage, in regard that thoſe in the front and rear cannot reciprocally come to the relief of one another.

To DEFILE, is to reduce an army to a ſmall front, in order to march through a defile.

DEFILING *a lodgment*. See ENFILADE.

DEFINITE, in grammar, is applied to an article that has a preciſe determinate ſignification; ſuch as the article *the* in Engliſh, *le* and *la* in French, &c. which fix and aſcertain the noun they belong to ſome particular, as *the king*, *le roy*; whereas in the quality *of king*, *de roy*, the articles *of* and *de* mark nothing preciſe, and are therefore indefinite.

DEFINITION, the ſhewing the meaning of one word by ſeveral other not ſynonymous terms.

The meaning of words being only the ideas they are made to ſtand for, by him that uſes them, the meaning of any term is then ſhewed, or the word is defined, when, by other words, the idea it is made the ſign of, and is annexed to it in the mind of the ſpeaker, is, as it were, repreſented and ſet before the view of another; and thus its ſignification is aſcertained. This is the only end and uſe of definitions, and therefore the only meaſure of what is, or is not, a good definition.

The names then of ſimple ideas are incapable of being defined, becauſe the ſeveral terms of a definition ſignifying ſeveral ideas, they can altogether by no means repreſent an idea which has no compoſition at all; and therefore a definition, which is properly but ſhewing the meaning of any one word by ſeveral others, not ſignifying the ſame each, can in the names of ſimple ideas have no place.

Definitions, which then take place in compound ideas only, are of two ſorts: the definition of the name, which is the explanation of what any word means; and the definition of the thing, which explains in what the nature of that thing conſiſts.

In order to form a definition of any thing, we muſt employ theſe three acts of the mind, firſt compare the thing to be defined with other things that are moſt like to itſelf, and ſee wherein its eſſence and nature agrees with them; and that is called the general nature or genus in a definition: ſo, if you would define what wine is, firſt compare it with other things like itſelf, as cyder, perry, &c. and you will find that it agrees eſſentially with them in this, that it is a ſort of juice. Secondly, conſider the moſt remarkable and primary attribute, property, or idea, wherein the thing differs from thoſe other things that are moſt like it, and that is its eſſential or ſpecific difference: ſo that wine differs from cyder and perry, and all other juices, in its being preſſed from a grape. This may be called its ſpecial nature, which diſtinguiſhes it from other juices.

Thirdly, join the general and ſpecial nature together, or the genus and the difference, and theſe make up a definition; ſo the juice of a grape, or juice preſſed from grapes, is the definition of wine. Here it muſt be obſerved, that in ſpeaking of the genus and difference, as compoſing a definition, it muſt always be underſtood, that the neareſt genus and ſpecific difference are required.

The next general nature, or the neareſt genus, muſt be uſed in a definition, becauſe it includes all the reſt: as if we were to define wine, we muſt ſay, wine is a juice, which is the neareſt genus; and not ſay, wine is a liquid, which is a remote general nature; or, wine is a ſubſtance, which is yet more remote, for juice includes both liquid and ſubſtance. Beſides, neither of theſe two remote general natures would make any diſtinction betwixt wine and a thouſand other ſubſtances, or other liquids: a remote genus leaves the thing too much undiſtinguiſhed. The ſpecific difference is that primary attribute which diſtinguiſhes each ſpecies from one another, while they ſtand ranked under the ſame general nature or genus; ſo that the ſpecific difference of wine is its preſſure from the grape, as cyder is preſſed from apples, and perry from pears.

In definitions we muſt alſo uſe the primary attribute that diſtinguiſhes the ſpecies, or ſpecial nature; and not attempt to define wine by its particular taſtes, or effects, or rather properties, which are but ſecondary, or conſequential, when its preſſure from the grape is the moſt obvious and primary diſtinction of it from all other juices. In ſome caſes, indeed, it is not ſo eaſily known, which is the primary idea that diſtinguiſhes one thing from another; ſo ſome would as ſoon define winter by the coldneſs of the ſeaſon, as by the ſhortneſs of the days, though the ſhortneſs of the days is doubtleſs the moſt juſt, primary, and philoſophical difference; ſince winter-days are always the ſhorteſt, but not always the coldeſt: beſides, the ſhortneſs is one cauſe of the coldneſs, but the coldneſs is no cauſe of their ſhortneſs.

The ſpecial rules for a good definition are theſe: 1. A definition muſt be univerſal, or adequate, that is, it muſt agree to all the particular ſpecies or individuals that are included under the ſame idea. 2. It muſt be proper, and peculiar to the thing defined, and agree to that alone. Theſe two rules, being obſerved, will always render a definition reciprocal with the thing defined, that is, the definition may be uſed in the place of the thing defined; or they may be mutually affirmed concerning each other. 3. A definition ſhould be clear and plain; and indeed it is a general rule concerning the definition both of names and things, that no word ſhould be uſed in either of them, which has any difficulty in it, unleſs it has been before defined. 4. A definition ſhould be ſhort, ſo that it muſt have no tautology in it, nor any words ſuperfluous. 5. Neither the thing defined, nor a mere ſynonymous name ſhould make any part of the definition.

Though the defining by the genus and difference be the ſhorteſt way, yet it may be doubted whether it be the beſt; certainly it is not the only, and ſo not abſolutely neceſſary. Thus, *man* may be defined to be *a ſolid extended ſubſtance, having life, ſenſe, ſpontaneous motion, and the faculty of reaſoning:* and certainly the meaning of the word *man* would be as well underſtood as when it is defined *a rational animal.*

DEFINITION, in rhetoric, is defined by Cicero, a ſhort comprehenſive explanation of a thing.

The definitions of the orator, it muſt be obſerved, differ much from thoſe of the logician and philoſopher: the orators take a large compaſs, and define things more ornamentally: thus man is a curious work of an Almighty Creator, framed after his own image, endued with reaſon, and born with immortality: but this rhetorical definition, in ſtrictneſs, comes nearer to the nature of a deſcription, than any accurate definition.

DEFLAGRATION, in chemiſtry, the kindling or ſetting fire to a ſalt, mineral, &c. either alone or mixed for that purpoſe, with a ſulphureous one, in order to purify it.

DEFLECTION *of the Rays of Light*, a property which Dr. Hook obſerved in 1675, and read an account of before the Royal Society, March 18, the ſame year. He ſays he found it different both from reflection and refraction, and that it was made towards the ſurface of the opaque body, perpendicularly.

This is the ſame property which Sir Iſaac Newton calls inflection. See the article INFLECTION.

DEFLUXION, in medicine, the falling of humours from a ſuperior to an inferior part of the body. See the articles CATARRH and PHTHISIS.

DEFLUXION *on the Eyes.* See the article EYE.

DEFORCEMENT, in law, the caſting any one out of his land, or with-holding of lands and tenements by force from the right owner.

DEFORMITY, the want of that uniformity neceſſary to conſtitute the beauty of an object.

DEFOSSION, BURYING ALIVE, a puniſhment which the Romans inflicted on ſuch of their veſtals as were guilty of incontinency.

DEFTERDAR, or DEFTARDAR, in the Turkiſh and Perſian polity, an officer of ſtate, anſwering to our lord-treaſurer, who appoints deputies in every province. See TREASURER.

DEGLUTITION, in medicine, the act of ſwallowing the food, performed by means of the tongue driving the aliment into the œſophagus, which, by the contraction of the ſphincter, protrudes the contents downwards.

DEGRADATION, the act of depriving a perſon for ever of a dignity or degree of honour, and taking away the title, badge, and privileges of it.

DEGRADATION, in painting, expreſſes the leſſening the appearance of diſtant objects in a landſcape, in the ſame manner as they would appear to an eye placed at that diſtance from them. See the articles PERSPECTIVE and LANDSCAPE.

DEGRADED CROSS, in heraldry, a croſs divided into ſteps at each end, diminiſhing as they aſcend towards the center, called by the French perronnée.

DEGREE, in geometry, a diviſion of a circle, including a three hundred and ſixtieth part of its circumference.

Every circle is ſuppoſed to be divided into three hundred and ſixty parts, called degrees, and each degree divided into ſixty other parts, called minutes; each of theſe minutes being again divided into ſixty ſeconds, each ſecond into thirds, and each third into fourths, and ſo on. See the articles MINUTE, SECOND, &c.

DEGREE *of Longitude.* See LONGITUDE.

DEGREE *of Latitude.* See the article LATITUDE.

A degree of the meridian on the ſurface of the globe is variouſly determined by various obſervers. Mr. Picart meaſured a degree in the latitude of 49° 21′, and found it equal to 57060 French toiſes. But the French mathematicians, who have lately examined Mr. Picart's operations, aſſure us, that the degree in that latitude is 57183 toiſes. Our countryman, Mr. Norwood, meaſured the diſtance between London and York, and found it 905751 Engliſh feet, and finding the difference of latitudes 2° 28′, determined the quantity of one degree to be 367196 Engliſh feet, or 69 Engliſh miles, 288 yards. Mr. Maupertuis meaſured a degree in Lapland, in the latitude of 66° 20′, and found it 57438 toiſes. A degree was likewiſe meaſured at the equator by other French mathematicians, and found to contain 56767.8 toiſes. Whence it appears, that the earth is not a ſphere, but an oblate ſpheroid. See the articles EARTH, SPHEROID, &c.

DEGREE, in the civil and canon law, denotes an interval in kinſhip, by which proximity and remoteneſs of blood are computed.

DEGREE, in chemiſtry, denotes the ſtate or intenſeneſs of fire. See FIRE.

DEGREES, in muſic, are the little intervals whereof the concords, or harmonical intervals, are compoſed.

DEGREE, in univerſities, denotes a quality conferred on the ſtudents or members thereof as a teſtimony of their proficiency in the arts or ſciences, and intitling them to certain privileges.

The degrees are much the ſame in all univerſities, but the laws thereof, and the previous diſcipline or exerciſe differ. The degrees are batchelor, maſter, and doctor; inſtead of which laſt, in ſome foreign univerſities, they have licentiate.

In each faculty there are two degrees, batchelor and doctor, which were anciently called batchelor and maſter. In the arts likewiſe there are two degrees which ſtill retain the ancient denomination, viz. batchelor and maſter.

DEHORS, in the military art, all ſorts of out-works placed at ſome diſtance from the walls of a fortification, the better to ſecure the main places, and to protract the ſiege, &c. See CROWN-WORK and HORN-WORK.

DEIFICATION, in antiquity, the ſame with apotheoſis. See APOTHEOSIS.

DEINCLINERS, or DEINCLINING DIALS, are ſuch as both decline and incline, or recline at the ſame time. See the article DIAL.

DEISM, the ſyſtem of religion acknowledged by the deiſts. See the next article.

DEISTS, in the modern ſenſe of the word, are thoſe perſons in Chriſtian countries, who acknowledging all the obligations and duties of natural religion, diſbelieve the Chriſtian ſcheme, or revealed religion. They are ſo called from their belief in God alone, in oppoſition to Chriſtians. The learned Dr. Clarke, taking the denomination in the moſt extenſive ſignification, diſtinguiſhes deiſts into four ſorts. 1. Such as pretend to believe the exiſtence of an eternal, infinite, independent, intelligent Being, and who teach that this Supreme Being made the world, though they fancy he does not at all concern himſelf in the management of it. 2. Thoſe who believe not only the Being, but alſo the providence of God with reſpect to the natural world, but who not allowing any difference between moral good and evil, deny that God takes any notice of the morally good or evil actions of men; theſe things depending, as they imagine, on the arbitrary conſtitutions of human laws. 3. Thoſe who having right apprehenſions concerning the natural attributes of God, and his all-governing providence, and ſome notion of his moral perfections alſo; yet being prejudiced againſt the notion of the immortality of the human ſoul, believe that men periſh entirely at death, and that one generation ſhall perpetually ſucceed another, without any future reſtoration or renovation of things. 4. Such as believe the exiſtence of a Supreme Being, together with his providence in the government of the world, as alſo the obligations of natural religion; but ſo far only, as theſe things are diſcoverable by the light of nature alone, without believing any divine revelation. Theſe laſt are the only true deiſts; but as the principles of theſe men would naturally lead them to embrace the Chriſtian revelation, the learned author concludes there is now no conſiſtent ſcheme of deiſm in the world.

DEITY, a term frequently uſed in a ſynonymous ſenſe with God. See GOD.

DELEGATES, commiſſioners appointed by the king under the great ſeal to hear and determine appeals from the eccleſiaſtical court.

DELETERIOUS, an appellation given to things of a deſtructive or poiſonous nature. See POISON.

DELF denotes a quarry or mine, where either ſtone or coal is dug; but is more particularly uſed for the veins of coal lying under ground, before it is dug up. A delf, or delve of coals, alſo denotes a certain quantity when dug.

DELF, in heraldry, is by ſome ſuppoſed to repreſent a ſquare ſod or turf, and to be ſo called from delving, or digging.

DELIA, in antiquity, feaſts celebrated by the Athenians in honour of Apollo, ſurnamed Delius.

DELIA was alſo a quinquennial feſtival in the iſland of Delos, inſtituted by Theſeus, at his return from Crete, in honour of Venus, whoſe ſtatue, given him by Ariadne, he erected on that place.

DELIAC, or DELIACAL PROBLEM, a problem much celebrated in the writings of the ancients, concerning the duplication of the cube. See the articles DUPLICATION and CUBE.

DELINEATION, or DELINEATING, the ſame with deſigning. See the article DESIGNING.

DELINQUENT, a guilty perſon, or one who has committed ſome fault, or offence, for which he is puniſhable.

DELIQUIUM, in chemiſtry, ſignifies the ſolution of any body, when expoſed to a cool and damp place, by the humidity it attracts from the air. The ſalt of tartar diſſolved in the above manner is called oil of tartar per deliquium.

DELIRIUM, in phyſic, an incapacity in the organs of ſenſation to perform their functions in a proper manner, ſo that the mind does not reflect upon or judge of external objects as uſual.

The word is derived from the Latin, *deliro*, to rave, or talk idly.

This frequently happens in fevers, from too impetuous a motion of the blood, which ſo far alters the ſecretion of the brain, as to diſorder the whole nervous ſyſtem.

DELIVERY, in medicine, the bringing forth a perfect fœtus or child from its mother's womb.

Delivery may happen at the ſeventh, eighth, ninth, tenth, and eleventh month, but not later, though ſome phyſicians maintain, that a delivery may be legitimate at the fourteenth. Humanity prompts us to give what aſſiſtance we can, beſides the manual operation, to the ſex in hard labour; for although provident Nature has taken ſuch good care for the propagation of the human ſpecies, that the labour pains are ſeldom attended with much danger; yet it ſometimes happens, that the birth is very difficult and tedious. And this difficulty proceeds from many different cauſes, with which thoſe who are truly ſkilful in the obſtetrical art are not unacquainted, and therefore they manage accordingly. But there is one caſe, in which they are often at a loſs what to do; and that is, when the lying-in woman is long ſeized with falſe pains, reſembling thoſe of the cholic. When this happens, it is proper to give a grain or two of opium, whereby thoſe pains, which rather hinder than promote the delivery, are appeaſed; and then Nature, thus relieved, does her work effectually. It is likewiſe of ſome moment in this caſe to know, that the opiate relaxes and opens the uterine parts, as it does all others that are in a ſtate of conſtriction or tenſion.

DELPHINIUM, lark's ſpur, in botany, a genus of plants, the corolla of which conſiſts of five unequal petals, diſpoſed circularly; of theſe the upper one is anteriorly more obtuſe than the others, and is emarginated, and extended behind into a tubulated horn, which is ſtraight, long, and obtuſe; the others are of an ovato-lanceolated figure, patent and nearly equal: the fruit conſiſts of one or three capſules, of an ovato-ſubulated figure, ſtraight, compoſed of a ſingle valve, opening inwards, and the ſeeds are angular and numerous.

DELPHINUS, in aſtronomy, a conſtellation of the northern hemiſphere, whoſe ſtars in Ptolemy's and Tycho's catalogues are ten, and in Mr. Flamſtead's eighteen.

DELTOIDES, in anatomy, a thick triangular muſcle of the arm, being one of the three elevators. See the article ELEVATOR.

This muſcle ariſes from the clavicle, and the acromion and ſpine of the ſcapula; and terminates at four fingers breadth below the neck of the humerus. See the article HUMERUS.

DELUGE, an inundation or overflowing of the earth, either wholly or in part, by water.

We have ſeveral deluges recorded in hiſtory, as that of Ogyges, which overflowed almoſt all Attica; and that of Deucalion, which drowned all Theſſaly in Greece; but the moſt terrible was that which is called the univerſal deluge, or Noah's flood, which overflowed and deſtroyed the whole earth, and out of which only Noah and thoſe with him in the ark eſcaped.

The account which Moſes gives of the deluge is ſhort and plain. He ſays, Gen. vii. 11, 12. "That all the fountains of the great deep were broken up; and the windows, or flood-gates, of Heaven were opened: and the rain was upon the earth forty days and forty nights." Theſe were the two great ſources of the deluge. The ſubterraneous waters of the deep or abyſs, wherein was lodged a great part of the waters which before the creation covered the face of the earth, were let out through chaſms upon the earth's ſurface; and at the ſame time immenſe quantities of rain poured down from the firmament or clouds, where it had been a long time gathering together, and continued forty days and forty nights without intermiſſion, and more or leſs for one hundred and fifty days, as Moſes intimates. This forty days rain falling, as is repreſented in Scripture, in ſpouts or cataracts, would naturally raiſe to a great height the ſubterraneous waters which it met breaking out of the abyſs upon the earth. This is well known to thoſe who have ſeen ſuch falls of waters in columns called ſpouts, in the Eaſt and Weſt Indies, when it is obſerved that the waters of the ſea, the outward compreſſion of the air being taken from them, riſe to meet them, agreeably to the laws of nature.

To theſe were added the floods of the river Euphrates, which in the beginning of June, or about the ſummer ſolſtice, being raiſed to a great height by the melted ſnow which ran from the mountains of Armenia, uſed to overflow all the low lands of Meſopotamia, Babylonia, Chaldæa, and Suſiana, where the firſt race of mankind chiefly dwelt.

After one hundred and fifty days the waters began to decreaſe, which was occaſioned by the ceaſing of the rain; and principally by an extraordinary or miraculous wind, like that which moved upon the waters at the beginning of the creation. This wind of God "paſſed over the earth," as Moſes relates in chap. viii. ver. 1; and by its powerful energy, as at the creation, carried off part of the flood of waters into the firmament or atmoſphere, whence it came, and drove the other part into the abyſs again, from which it had broke out, and whither it would naturally run back after the ceaſing of the rain; and the ſun would alſo exhale great quantities of it in vapours: ſo that in the ſpace of twelve months the earth was every where dried, and brought forth graſs and fruits as before.

One may with ſome probability ſuppoſe, that in the decreaſe of the waters of the deluge, fiſhes of ſeveral kinds would be left upon mountains, where their bones and ſhells are ſtill found; and that others would ſink with the waters below the broken ſurface of the earth to ſeveral depths, where their bones and ſhells alſo are found. But it is not probable that the deluge could diſſolve the earth into a fluid ſtate to any depth: and that bones and ſhells of fiſhes and other animals ſhould thereby become ſoft, and being mixed with the ſubſtance of ſtone reduced to a fluid matter, ſhould by degrees harden and petrify, as we ſee them at this day. A deluge has no natural tendency to produce theſe effects; nor are any ſuch effects intimated to have been wrought by the miraculous power of God, which brought the deluge upon the earth: ſo that the above-mentioned phænomena may be better accounted for from the chaos which preceded the creation or formation of the earth. This chaos was an unformed fluid maſs, covered with water to a conſiderable depth at leaſt: and when the water was ſeparated by the raiſing of the earth above it, bones and ſhells of fiſhes and other animals which were diſſolved and mixed with the chaotic matter before the formation of the preſent earth, would naturally be laid on the tops of mountains, and alſo within the earth, and would there harden in and with the earthy ſubſtance, and petrify as they are found.

The queſtion concerning the univerſality of the deluge, is of the moſt ſerious and important nature. Some learned men have denied it, and pretended that to maintain it were an abſurdity, and a great argument of want of reaſon; that to believe God capable of making things contrary to nature and reaſon, were to form a miſtaken idea of his power and greatneſs; that the univerſality of the deluge is contrary to both; that it may be geometrically demonſtrated, that although all the clouds in the air were reduced to water, and fell upon the earth, yet would they not cover the whole ſuperficies of it to the height of a foot and an half; and that if all the water contained in rivers and in the ſea, were to be ſpread over the earth, it would never riſe to the height of four thouſand paces, ſo as to reach the tops of the higheſt mountains, unleſs it was rarified in an extraordinary manner, and then it would not be in a condition to ſupport the weight of the ark; that if all the air which encompaſſes the earth were changed into water, this would not make above one and thirty feet of water, which would be very far from what were neceſſary to cover the whole ſurface of the earth and the higheſt mountains ſo far as fifty cubits above their tops.

All this ſeems contrary to reaſon, and what follows, to nature. The rain does not fall upon eminences above ſix hundred paces high: it does not deſcend from a greater altitude than this, and there can be no rain formed higher which would not immediately be frozen by the cold that prevails there: whence then came the water which was to cover the tops of theſe mountains that are above the middle region of the air? Will any one ſay, that the rain found a way back again? How could the plants be preſerved ſo long under water? How could the animals that came out of the ark diſperſe themſelves throughout the whole world? Beſides, all the earth was not then peopled: why then ſhould the deluge be intended to be univerſal? Was it not ſufficient for it to reach thoſe countries which were inhabited? How were beaſts brought from the extremities of the world into the ark?

Theſe are the principal objections which are formed againſt the univerſality of the deluge. Iſaac Voſſius mentioned them in a diſſertation compoſed particularly by him, under the title, De Ætate Mundi, in his epiſtle to Andrew Colvius, and in his anſwers to Andrew Scotanus, and George Hornius.

We ſhall now ſhew whether Voſſius had reaſon to depart in this particular from the common opinion of the fathers, and of all commentators, as well catholics as proteſtants. He viſibly departs from the text of Moſes which we have related, and which cannot more clearly evidence than it does, the univerſality of the deluge.

But the univerſality of the deluge, ſays Voſſius, is impoſſible and unneceſſary: Why ſhould the whole earth be overflowed to deſtroy mankind? Was it not ſufficient to pour forth the waters into countries where there were men? But who told Voſſius that the world was not then entirely peopled, after above two thouſand years continuance? For, according to the Septuagint, whoſe chronology is ſupported by him, the world was above 2200 years old in the beginning of the deluge: Was a longer time neceſſary for the ſettling inhabitants in all the countries of the world? Beſides, did he think to find leſs conſiderable difficulties in the ſyſtem of a particular deluge? Suppoſing this, What neceſſity was there to build at great expence a prodigious ark, to bring all ſorts of animals into it, to oblige eight perſons to enter into it? Was all this done to ſecure them from an inundation which was to cover ſome part only of the earth? Was it not more eaſy to command theſe people to ſtay in thoſe countries which the deluge was not to reach, and by a particular providence to conduct thoſe animals thither, which as yet were not there?

How could the waters continue at the height of fifteen cubits above the talleſt mountains of Armenia, for example, Chaldæa or Perſia, without ſpreading into the neighbouring countries? How ſhould ſuch a veſſel as the ark float for many months upon a mountain of water, without ſliding by its own weight down the declivity of it? Now Voſſius himſelf confeſſes, that ſuppoſing a particular deluge, this would be the ſituation of the ark upon the waters.

He ſays, that if the deluge had extended itſelf throughout all the world, the plants and trees would have died:

that according to his own ſyſtem they did not, ſince Noah and his family, and the animals which he had preſerved in the ark, when they went out of it, lived and ſettled in thoſe very countries to which, by his confeſſion, the deluge did extend; that is to ſay, round about Mount Ararat, in Meſopotamia and Chaldæa. If the plants and trees did not die in this country, why ſhould they die elſewhere? And if Noah could have ſtored the country afreſh with them, ſuppoſing they did die, why might he not have done the ſame in the reſt of the world in time, and a ſucceſſion of ages? And if the waters of the deluge, which he aſſerts to have been particular only, corrupted all the trees and plants wherever they reached, whence came the branch or ſhoot of the olive-tree, which the dove brought to Noah? We have many experiments of an infinite fertility of nature in the production and reproduction of plants; we know of many wonderful productions from the preſervation of ſeeds, both under the water in the earth, and out of the earth for many years, and which are afterwards as fruitful as before, we know that water, with reſpect to plants, is a principle of fertility infinitely more proper to preſerve than to deſtroy them: that many plants grow under water; that all require moiſture to produce and multiply; the dung of beaſts and birds reproduces thoſe grains in the fields which have been eaten by them; virgin earth expoſed to the air produces herbs which were never ſown there; earth taken from under the water will do the ſame. No one can boaſt that he knows thoſe wiſe precautions which the author of nature has taken for the preſervation of the ſpecies. Trunks of trees have been ſeen to grow green again, and become fruitful, after having been ten or eleven years plucked up by the roots.

Add to all this, that the waters of the deluge did not cover the whole ſurface of the earth for more than about an hundred and ten days: for from the firſt day of the tenth month they began to diſcover the tops of the mountains. Noah entered the ark upon the ſeventeenth day of the ſecond month, after which the rain fell forty days and forty nights; and two hundred and fifty-ſix days before the end of the deluge the waters began to riſe again in vapours; ſo that the time of all the ſeeds and plants continuing under water, was far from being a whole year.

The difficulty of bringing beaſts from all places of the world to Noah, is not ſo great as may be imagined. The number of beaſts created in the beginning, is not ſo conſiderable as we might believe. God created one man and one woman, and probably a couple of every kind of animals, male and female. From this couple of horſes, for example, of dogs, or goats, all the animals we know of, of the ſame ſpecies, were born. The difference which is obſerved between the different ſorts of dogs and horſes, is not greater than that which we ſee between the different ſorts of men, of whom ſome are white, and others black, others of an olive colour, others red, ſome have a beard, others have none.

Beſides, there were all the ſeveral ſpecies of animals in the places round about Paradiſe, ſince God brought all ſorts of them to Adam, in order to be named by him. It is very credible that the terreſtrial Paradiſe was not far from Armenia, and the ſource of the Tigris and Euphrates, which are expreſsly mentioned by Moſes in his deſcription of this garden. Laſtly, there is ſcarce any doubt to be made, but that Noah's ark was built in Meſopotamia, ſomewhere towards Chaldæa. It is very probable therefore, that there were as many animals in this country and the places adjacent, as were neceſſary to be put into the ark. If there are ſome, that through long habit, which becomes as it were a ſecond nature, cannot now live in this part of the world, which, however, we think very difficult to prove, it does not follow that there were any ſuch in Noah's time. If on a ſudden any men or beaſts were to be conveyed from the warmeſt parts of Africk to the coldeſt places in the north, it is very credible, that both would periſh there; but the caſe would not be the ſame if they were to be removed by inſenſible degrees nearer to theſe places, or were to be bred there from their being young: and if there are ſome beaſts which are to be found only in particular countries, we are not to infer from thence, that there never were any of them elſewhere. We know very well, that formerly there were many beaſts of a particular ſpecies in ſome countries, where at preſent very few or none at all of the ſame kind are to be met with, ſuch as the hippopotami in Egypt, wolves in England, and beavers in France.

But the ſtrongeſt objection propoſed againſt the univerſality of the deluge is taken from the impoſſibility of finding ſo much water in nature, as was requiſite to cover all the earth to the height mentioned by Moſes; that is to ſay, of fifteen cubits above the higheſt mountains, which are ſuppoſed to be about a thouſand or twelve hundred paces in perpendicular height. The queſtion is, Whether the waters of the earth may be ſufficient to cover it to ſuch an height; that is to ſay, whether the waters of the ſea, of fountains, rivers, and the conſervatories of water upon earth, together with the clouds in the air, could ſuffice for the purpoſe we are ſpeaking of.

In the beginning of the creation the terreſtrial globe was all hemmed in with water, the earth was a chaos, the ſpirit of God moved upon the face of the waters, and darkneſs covered the whole face of the deep, as Moſes ſays. The Pſalmiſt expreſſes himſelf in as particular a manner. "Thou layeſt the foundations of the earth, that it never ſhould be moved at any time; thou coveredſt it with the deep as with a garment; the waters ſtood above the mountains. At thy rebuke they fled, at the voice of thy thunder they were afraid. They go up as high as the hills, and down to the valleys beneath, even unto the place which thou haſt appointed for them. Thou haſt ſet them their bounds which they ſhall not paſs; neither turn again to cover the earth." Pſ. civ. 5, 6, 7.

Here therefore is an univerſal deluge clearly deſcribed in the beginning of the world; and what prevents its returning a ſecond time? What but the commands of God, who has ſaid to the waters of the ſea, "Hither ſhalt thou come, but no farther; and here ſhall thy proud waves be ſtayed:" And Wiſdom in the Proverbs, "When he prepared the Heavens, I was there; when he ſet a compaſs upon the face of the depth."

But, it will be ſaid, to reduce things to the firſt ſtate wherein Moſes deſcribes them, God muſt not only have ſpread the waters of the ſeas, fountains, and rivers, over the earth, which ſeems impoſſible without diſordering the whole œconomy of the terreſtrial globe; but likewiſe muſt have recalled the waters which he had raiſed above the firmament, and have brought them down upon the earth. "And God ſaid, Let there be a firmament in the midſt of the waters, and let it divide the waters from the waters. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament." The waters below the firmament are indubitably the waters of the ſea and rivers; the waters above it are thoſe which are rarified in the atmoſphere itſelf: in ſhort, in what place ſoever theſe waters may be, and whatſoever may become of them, it is certain that they are not annihilated; that it was altogether as eaſy for God to reduce them to their firſt ſtate, and form them into waters at the time of the deluge, as it was for him in the beginning of the world, to reduce them into air or vapours; however, this demonſtrates that there is nothing in the univerſal deluge contrary to the laws of nature, nor impoſſible to the power of God.

Moſes, to ſhew us the change which happened at that time in nature, tells us, "That the fountains of the great deep were broke open, and the windows of Heaven were opened, and the rain was upon the earth forty days and forty nights." As if he had ſaid, that the earth was reduced to very near the ſame ſtate wherein it was in the beginning; that it returned in ſome ſort to a chaos. The barriers and banks which reſtrained the waters of the ſea, were broken down; the cataracts of the firmament were opened; and the lower and upper waters were again collected together, as in the beginning.

But ſuppoſing the ark to have been raiſed fifteen cubits above the higheſt mountains, how could the men and beaſts in it live and breathe amidſt the cold and extreme ſubtility of the air in the middle region, wherein ſome affirm that no animal whatſoever can live long? Two things may be ſaid in reply to this: Firſt, that the arguments and ſuppoſed experiments which are produced to prove, that there is no living on the higheſt mountains in the world, are by no means certain. It is indeed colder, and the air is finer and ſharper on the tops of the higheſt mountains, but it is not true that people die there, as we know from many very certain relations.

Secondly, the middle region of the air ought not to be looked upon as a fixed point, and a limited region, which never either riſes or falls; it is with reſpect to us more or leſs elevated, according to the greater or leſſer heat of the ſun. During winter it is much nearer the earth than in the warmth of ſummer; or to ſpeak more properly, the cold which reigns in the middle region of the air during the ſummer, reigns likewiſe in the lower region during winter. Thus, ſuppoſing the deluge to be univerſal, it is evident, that the middle region of the air muſt have riſen higher, and removed to a greater diſtance from the earth and waters; and on the contrary, the lower region muſt have approached nearer unto both, in proportion as the waters of the deluge encreaſed or decreaſed. So that the ark was all along in the lower region of the air, even when it was carried fifteen cubits above the higheſt mountains, and the men and beaſts, which were encloſed in it, breathed the ſame air as they would have breathed on earth, a thouſand or twelve hundred paces lower, if the deluge had not happened.

We do not, however, pretend by all theſe arguments to prove that the univerſal deluge was produced without a miracle; we acknowledge that it was a very extraordinary one, and particularly remarkable in the fall of the waters for forty days, and in their evaporation, or return into the deep and air, in what manner ſoever this may have been effected. We confeſs that this terrible event does involve almoſt inexplicable difficulties, as well according to the ſyſtem which maintains it to be univerſal, as that which ſuppoſes it to be only particular; and ſince it is neceſſary to admit a chain of miracles in both ſyſtems, we had better, ſurely, adhere to the common opinion of the fathers, and interpreters in all ages and communions, than hunt after new ways which engage us in perplexities equal to thoſe which we endeavour to avoid. For if it is our deſign, by allowing the ſyſtem of a particular deluge, to ſtop the mouths of libertines, and ſecure the authority of the Holy Scriptures; how ſhould we ſucceed, while we offer violence to the text, and make it ſay that the deluge covered but a part only of the earth, while Moſes and all the ſacred authors who have ſpoken of it, ſhew ſo diſtinctly the univerſality of it?

DELVIN, among the miners of Cornwall, a kind of ſlate more uſually called killas. See the article KILLAS.

DEMAIN, or DEMESNE, in its common acceptation, is uſed for the lands round a manor-houſe, occupied by the lord. See the article MANOR.

DEMAIN, or DEMESNE, in law, is commonly underſtood to be the lord's chief manor place, with the lands thereto belonging, which he and his anceſtors have time out of mind kept in their own manual occupation, for the maintenance of themſelves and their families. See the article MANOR.

DEMAIN denotes alſo all the parts of any manor not in the hands of freeholders.

DEMAND, in law, the calling upon a perſon for any thing that is due.

There are two kinds of demands, the one in deed, and the other in law. And theſe are again divided into three ſorts; one in writing, without ſpeaking, as in every writ of præcipe; one other without writing, being a verbal demand of the perſon who is to perform ſomething; and another made without either words or writing, which is termed a demand in law, as in caſes of entries on lands, &c. And as an entry upon land and taking diſtreſs for rent, are a demand in law of the land and rent, ſo the bringing an action of debt for money due on a bond, is a demand in law of the debt.

Debts and claims are to be demanded in time by the ſtatute of limitations, or they will be loſt by law.

DEMANDANT, in law, is the plaintiff in all real actions, wherein land, &c. is demanded; for theſe actions are by demands, as perſonal actions are by plaints.

DEMESNE, the ſame with demain. See DEMAIN.

DEMI, a word uſed in compoſition with other words to ſignify half. In words borrowed from the Latin we uſe ſemi. See the article SEMI.

DEMI-BASTION, a fortification having only one face and one flank. See the article BASTION.

DEMI-CANNON *Loweſt*, the name of a piece of ordnance generally about ſix inches bore, 5400 pound weight, ten or eleven feet long, and carrying a ſhot of about thirty pounds weight. It carries point blank 156 paces.

DEMI-CANNON *Ordinary* is ſix inches and an half bore, twelve feet long, and weighs 5600 pounds. It carries a ſhot of ſix inches $\frac{1}{6}$ in diameter, whoſe weight is thirty-two pounds, and ſhoots point blank 162 paces.

DEMI-CANNON *of the loweſt Size*, is ſix inches $\frac{1}{4}$ bore, twelve feet long, and weighs 6000 pounds weight. It ſhoots point blank 180 paces.

DEMI-CROSS, an inſtrument formerly uſed by the Dutch to take the ſun's altitude, or that of a ſtar, at ſea.

DEMI-CULVERIN, a piece of ordnance uſually four inches $\frac{1}{2}$ bore, 2700 pounds weight, ten feet long, and carrying point blank 175 paces.

DEMI-CULVERIN *of the leaſt Size*, is four inches $\frac{1}{4}$ bore, ten feet long, and 2000 pound weight. It carries a ball of four inches diameter, and of nine pounds weight, and its level range is 174 paces.

DEMI-CULVERIN *of the largeſt Sort*, is four inches $\frac{3}{4}$ bore, ten feet $\frac{1}{3}$ long, and weighs 3000 pounds weight. It carries a ball of four inches $\frac{1}{2}$ diameter, weighing twelve pounds eleven ounces, point blank 178 paces.

DEMIDITONE, in muſic, is the ſame with a third minor. See the article THIRD.

DEMI-GOD, &c. See GOD, HERO, &c.

DEMI-GORGE, in fortification, is that part of the polygon which remains after the flank is raiſed, and goes from the curtain to the angle of the polygon. It is half of the vacant ſpace or entrance into a baſtion. See the article GORGE.

DEMI-LUNE, a ſmall flanked baſtion, placed before the point of a baſtion when it is too weak. This work is alſo ſometimes placed before the curtain, when the moat is a little wider than it ought to be.

DEMI-QUAVER, a note in muſic, two of which are equal to a quaver. See the articles SEMI-QUAVER and QUAVER.

DEMI-SEMI-QUAVER, in muſic, the ſhorteſt note, two of them being equal to a ſemi-quaver. See the articles SEMI-QUAVER, CHARACTER, &c.

DEMOCRACY, the ſame with a popular government, wherein the ſupreme power is lodged in the hands of the people: ſuch were Rome and Athens of old; but as to our modern republics, Baſil only excepted, their government comes nearer to ariſtocracy than democracy.

DEMOISELLE, in ornithology, a bird of the crane-kind, ſomething leſs than a heron, known alſo by the name of the dancing bird, on account of its frequent leaping and turning round, and varying the motion of its head at the ſame time. Immediately from behind each eye, ſprings forth a tuft of long, ſoft, white feathers, which tend backwards in a very graceful manner, and wave with the leaſt air. The fore-part of the neck, on the contrary, is covered with ſoft, long, and ſlender black feathers, which fall on the breaſt in a very pleaſing manner, ſometimes cloſe, and at other times detached like a lady's tippet.

DEMONSTRABLE, a term uſed in the ſchools, to ſignify that a thing may be clearly proved. Thus it is demonſtrable, that the three angles of a triangle are equal to two right ones.

DEMONSTRATION, a method of reaſoning, whereby the mind clearly perceives the agreement or diſagreement between the ideas it conſiders. This knowledge, though it be certain, is not ſo clear and evident as intuitive knowledge. It requires pains and attention, and ſteady application of mind, to perceive the agreement or diſagreement it conſiders; and there muſt be a progreſſion by ſteps and degrees, before the mind in this way can arrive at certainty. Before demonſtration, there was a doubt, which in intuitive knowledge cannot happen to the mind that has its faculty of perception left to a degree capable of diſtinct ideas, no more than it can be a doubt to the eye that can diſtinctly ſee white and black, whether this ink and paper be all of a colour. In every ſtep that reaſon makes in demonſtrative knowledge, there is an intuitive knowledge of that agreement or diſagreement it ſeeks with the next intermediate idea, which it uſes as a proof; for, if it were not ſo, that would yet need a proof, ſince, without the perception of ſuch agreement or diſagreement of the intermediate ideas, there is no knowledge produced. Each ſtep and progreſſion of the demonſtration muſt alſo be exactly carried in the mind, and a man muſt be ſure that no part is left out; which, becauſe, in long deductions, the memory cannot eaſily retain, this knowledge becomes more imperfect than intuitive, and men often embrace falſhoods for demonſtrations.

It has generally been taken for granted, that mathematics alone is capable of demonſtrative certainty; but to have ſuch an agreement or diſagreement as may be intuitively perceived, is not the privilege of the ideas of number, extenſion, and figure alone: it may poſſibly be the want of due method and application in us, and not of ſufficient evidence in things, that demonſtration has been thought to have ſo little to do in other parts of knowledge; and where it can perceive the agreement or diſagreement of any two ideas, by an intuitive perception of the agreement they have with any intermediate ideas, there the mind is capable of demonſtration, which is not limited to the ideas of figures, number, extenſion, or their modes.

There are two things required in juſt demonſtration; firſt, that every propoſition of which it conſiſts, conſidered ſeparately, be true; ſecondly, that the conſequences, drawn from other foregoing things, neceſſarily flow from them; or that all the conſequences be contained in the antecedents or premiſſes.

Demonſtration is of two kinds, the one a priori, the other a poſteriori. Demonſtration a priori, which alone, to ſpeak properly, is demonſtration, is that by which the effect is demonſtrated by its cauſe; as when we prove the exiſtence of light by the exiſtence of the ſun. Demonſtration a poſteriori, is when we demonſtrate the cauſe by the effect; as when we prove the exiſtence of the ſun from the exiſtence of light. To this kind of demonſtration may alſo be reduced the demonſtration which is made from the remote cauſe; as when one proves that a ſtone doth not breathe, becauſe it is not an animal, when it would have been more proper to have proved it by this, becauſe it has no lungs; yet that, tho' nearer, is not the direct property of an animal, ſince many animals, as oyſters, &c. have no lungs. Authors alſo mention another kind of demonſtration, called oſtenſive; which is when a thing is demonſtrated from proper principles, directly and by itſelf. To this they have added another kind of demonſtration, which they call deductive to an inconvenience; which, though it be inferior to the former, yet may be of uſe, where we cannot have an oſtenſive demonſtration, as being alſo of inſeparable neceſſity: and this is when we demonſtrate a thing to be ſo, becauſe, if it ſhould be otherwiſe, either an abſurdity, an impoſſibility, or a contradiction will neceſſarily follow.

DEMONSTRATIVE, in rhetoric, one of the kinds of eloquence, viz. that which obtains in the compoſition of panegyrics, invectives, &c. See the article RHETORIC.

DEMONSTRATIVE, in grammar, a term given to ſuch pronouns as ſerve to indicate or point out a thing. Of this number are, *hic, hæc, hoc*, among the Latins; and *this, that, theſe, thoſe*, in Engliſh. See PRONOUN.

DEMULCENTS, among phyſicians, medicines good againſt acrimonious humours. Such are the roots of marſh-mallows, of white lilies, of liquorice, and of viper graſs, the five emollient herbs. See the article EMOLLIENT.

DEMURRAGE, in commerce, an allowance made to the maſter of a ſhip by the merchants, for ſtaying in a port longer than the time firſt appointed for his departure.

DEMURRER, in law, a ſtop put to any action upon ſome point of difficulty which muſt be determined by the court, before any further proceedings can be had in the ſuit.

DEMURRER *to Evidence*, is where a queſtion of law ariſes thereon; as if the plaintiff in a ſuit gives in evidence any records, deeds, writings, &c. upon which a law-queſtion ariſes, and the defendant offers to demur upon it, then the plaintiff muſt join in ſuch demurrer, or wave his evidence.

DEMURRER *to Indictments*, is when a criminal joins iſſue upon a point of law in an indictment or appeal, allowing the fact as laid to be true. And if the indictment, or appeal, prove good in the opinion of the judges by whom the demurrer is to be tried, and not by the inqueſt, they proceed to judgment and execution, as if the party had been convicted by confeſſion or verdict.

DENARIUS, in Roman antiquity, the chief ſilver coin among the Romans, worth in our money about ſevenpence three farthings. As a weight, it was the ſeventh part of a Roman ounce.

DENARIUS is alſo uſed in our law books for an Engliſh penny.

DENDRACHATES, in natural hiſtory, the name uſed by the ancients for an extremely elegant and beautiful ſpecies of agate, the ground of which is whitiſh, variegated with veins of a brighter white.

DENDRANATOMY, a term uſed by ſome for a deſcription of the various parts of trees, as root, trunk, branch, bark, wood, pith, flower, fruit, &c.

The word is formed from the Greek, *δενδρον*, a tree, *ανα*, and *τεμνω*, to diſſect.

DENDRITÆ, in natural hiſtory, a name given to thoſe ſpecies of ſeptariæ which have repreſentations of trees, &c.

DENEB, an Arabic term ſignifying tail, uſed by aſtronomers to denote ſeveral fixed ſtars. Thus deneb elecet, ſignifies the bright ſtar in the lion's tail. Deneb adigege, that in the ſwan's tail, &c.

DENIER, a ſmall French copper-coin, of which twelve make a ſol.

DENIZEN, in law, an alien made a ſubject by the king's letters patent, otherwiſe called donaiſon, becauſe his legitimation proceeds *ex donatione regis*, from the king's gift.

DENMARK, a kingdom ſituated between 8° and 13° of eaſt longitude, and between 54° and 58° of north latitude: it comprehends the peninſula of Jutland, and the iſlands of Zeland, Funen, &c.

To the king of Denmark likewiſe belong Norway, Iceland, and the dutchy of Holſtein.

DENOMINATION, a name impoſed on any thing, uſually expreſſing ſome predominant quality.

DENOMINATIVE QUALITY, that quality from which things take their denomination.

DENOMINATOR, in arithmetic, a term uſed in ſpeaking of fractions.

The denominator of a fraction is the number below the line, ſhewing into how many parts the integer is ſuppoſed to be divided. Thus in the fraction $\frac{1}{4}$, the number 4 ſhews that the integer is divided into four parts. So in the fraction $\frac{a}{b}$, b is the denominator. See the article FRACTION.

Denominator of a ratio is the quotient ariſing from the diviſion of the antecedent by the conſequent. Thus 8 is the denominator of the ratio 40 : 5, becauſe 40 divided by 5, gives 8 for a quotient. It is alſo called the exponent of a ratio. See the article EXPONENT.

DENSHRING, or DEVENSHRING, in huſbandry. See DEVENSHRING.

DENSITY *of Bodies*, is that property directly oppoſite to rarity, whereby they contain ſuch a quantity of matter under ſuch a bulk.

Accordingly, a body is ſaid to have double or triple the denſity of another body, when their bulk being equal, the quantity of matter is in the one double or triple the quantity of matter in the other. The denſities and bulks of bodies are the two great points upon which all mechanics or laws of motion turn. It is an axiom that bodies of the ſame denſity contain equal maſſes under equal bulks. If the bulks of two bodies be equal, their denſities are as their maſſes; conſequently the denſities of equal bodies are as their gravities. If two bodies have the ſame denſity, their maſſes are as their bulks; and as their gravity is as their maſſes, the gravity of bodies of the ſame denſity is in the ratio of their bulk. Hence alſo bodies of the ſame denſity are of the ſame ſpecific gravity; and bodies of different denſity, of different ſpecific gravity. The quantities of matter in two bodies, are in a ratio compounded of their denſity and bulk; conſequently their gravity is in the ſame ratio. If the maſſes or gravities of two bodies be equal, the denſities are reciprocally as their bulks. The denſities of any two bodies are in a ratio compounded of the direct ratio of their maſſes, and a reciprocal one of their bulks; conſequently, ſince the gravity of bodies is as their maſſes, the denſities of bodies are in a ratio compounded of the direct ratio of their gravities, and a reciprocal one of their bulks. See the method of finding the ſpecific gravities, and conſequently the denſities, of both ſolid and fluid bodies under the articles HYDROSTATICAL BALLANCE, and SPECIFIC GRAVITY.

DENSITY *of the Air*, is a property that has employed the later philoſophers ſince the diſcovery of the Toricellian experiment.

It is demonſtrated, that in the ſame veſſel, or even in veſſels communicating with each other at the ſame diſtance from the center, the air has every where the ſame denſity. The denſity of the air, *cæteris paribus*, increaſes in proportion to the compreſſing powers. Hence the inferior air is denſer than the ſuperior; the denſity, however, of the lower air is not proportional to the weight of the atmoſphere on account of heat and cold, and other cauſes perhaps which make great alterations in denſity and rarity. However, from the elaſticity of the air, its denſity muſt be always different at different heights from the earth's ſurface; for the lower parts being preſſed by the weight of thoſe above, will be made to accede nearer to each other, and the more ſo as the weight of the incumbent air is greater. Hence, the denſity of the air is greateſt at the earth's ſurface, and decreaſes upwards in geometrical proportion to the altitudes taken in arithmetical progreſſion.

If the air be rendered denſer, the weight of bodies in it is diminiſhed; if rarer, increaſed, becauſe bodies loſe a greater part of their weight in denſer than in rarer mediums. Hence, if the denſity of the air be ſenſibly altered, bodies equally heavy in a rarer air, if their ſpecific gravities be conſiderably different, will loſe their equilibrium in the denſer, and the ſpecifically heavier body will preponderate. See AIR and CONDENSER.

DENSITY *of the Planets*. In homogeneous, unequal, ſpherical bodies, the gravities on their ſurfaces are as the diameters, if the denſities are equal. But if the bodies be equal, the gravities will be as the denſities. Therefore, in bodies of unequal bulks and denſities, the gravity will be in a compound ratio of the diameters and denſities.

DENTALIUM, in natural hiſtory, a ſimple ſhell having no hinge, and formed only of one piece: it is o a figure approaching to cylindric or conic, and is ſometimes crooked, ſometimes ſtraight; ſometimes cloſed a one end, ſometimes open at both: its animal inhabitant is called nereis.

DENTARIA, toothwort, in botany, a genus o plants, the corolla of which is cruciform, and conſiſt of four roundiſh, obtuſe petals, ſlightly emarginated plane, and ending in ungues of the length of the cup the fruit is a long, roundiſh, bilocular pod, conſiſtin of two valves: the ſeeds are numerous and roundiſh.

The root of this plant, the only part uſed in medicin is accounted drying and aſtringent.

DENTICLES, or DENTILS, in architecture, an ornament in corniches bearing ſome reſemblance to teet particularly uſed in the Ionic and Corinthian orders. Th are cut on a little ſquare member, properly called de ticulus, and the notches or ornaments themſelves, denti In the ancient times dentils were never uſed in the Ion corniche, yet they are found in the remains of the theat of Marcellus, which ſome take for an argument that V truvius had not the direction of that building. Vitruvi

DEODAND, in our cuſtoms, implies a thing devoted or conſecrated to God, for the pacification of his wrath, in caſe of any misfortune; as a perſon's coming to a violent end, without the fault of any reaſonable creature; as if a horſe ſhould ſtrike his keeper, and ſo kill him. In this caſe, the horſe is to be a deodand; that is, he is to be ſold, and the price diſtributed to the poor, as an expiation of that dreadful event.

DEPART, in chemiſtry, a method of refining, or ſeparating gold from ſilver, by means of aqua fortis, generally called quartation.

DEPARTURE, in law, ſignifies a departing or going from a plea given in bar of an action. It is likewiſe uſed where a plaintiff in his declaration ſets forth one thing, and after the defendant has pleaded thereto, he in his replication ſhews new matter different from his declaration.

Departure, in navigation, is the eaſting or weſting of a ſhip, with reſpect to the meridian it departed or ſailed from, numbered in degrees, or miles, of the equator.

DEPHLEGMATED, an appellation given to ſpirits well freed from the phlegm.

DEPHLEGMATION, in chemiſtry, the ſame as rectification, or the freeing a ſpirit from its phlegm, either by diſtillation, or ſome other means.

DEPILATORY Medicines, thoſe applied in order to take off the hair: ſuch are lime and orpiment known to be, but which ought to be uſed with great caution.

DEPONENT, in Latin grammar, a term applied to verbs which have active ſignifications, but paſſive terminations or conjugations, and want one of their participles paſſive.

Deponent, in law, a perſon who makes a depoſition. See the article Deposition.

DEPOPULATION, the act of committing waſte.

DEPOSITION, in law, the teſtimony given in court by a witneſs, upon oath.

In chancery, depoſition is a teſtimony ſet down in writing, by way of anſwer to the interrogations exhibited in chancery, where ſuch witneſs is called deponent. Depoſitions in one cauſe may be uſed at the hearing of another, where they are between the ſame parties, &c. without any motion: this is not permitted in other courts, without a ſpecial order of the court of chancery. The depoſitions in chancery, after the cauſe is determined there, may be given in evidence in a trial at bar, in any of the other courts.

DEPRECATION, in rhetoric, a figure whereby the orator invokes the aid and aſſiſtance of ſome one; or prays for ſome great evil or puniſhment to befal him who ſpeaks falſely, either himſelf or his adverſary.

DEPRECATORY, or Deprecative, in theology, a term applied to the manner of performing ſome ceremonies in the form of prayer.

DEPRESSION *of Equations.* See the article Equation.

Depression *of the Pole.* When a perſon ſails or travels towards the equator, he is ſaid to depreſs the pole, becauſe as many degrees as he approaches nearer the equator, ſo many degrees will the pole be nearer the horizon. This phænomenon ariſes from the ſpherical figure of the earth.

DEPRESSOR, or Deprimens, in anatomy, a name applied to ſeveral muſcles, becauſe they depreſs the parts they are faſtened to.

Depressor Labii Superioris, or Triangularis, is a muſcle that ariſes from the lower edge of the underjaw, between the maſſeter and quadratus, and aſcends by the angle of the mouth to the upper-jaw. Theſe two muſcles acting together, expreſs a ſorrowful countenance, becauſe they draw downwards the corners of the mouth and cheeks.

Depressores Nasi, a pair of muſcles ariſing from the os maxillare, above the dentes inciſores; and are inſerted into the extremities of the alæ, which they pull downwards.

Depressor Anguli Oris, a name given by Albinus to the muſcle called by others depreſſor labiorum communis. See the article Depressor Labii.

Depressores Oculi, a pair of muſcles ſpringing from each corner of the eye, and anſwered by another pair of the like figure and ſtructure, in the lower eye-lid. See the article Eye.

DEPRIVATION, in the canon-law, the depoſing a biſhop, parſon, vicar, &c. from his office and preferment.

DEPTH, in geometry, the ſame with altitude; though, ſtrictly ſpeaking, we only uſe the term depth to dénote how much one body, or part of a body, is below another.

Depth *of a Battalion or Squadron*, in military affairs, the number of ranks, or the quantity of men, of which each file conſiſts in a battalion or ſquadron.

The depth of the battalion is generally four men, and that of the ſquadron three.

So if the battalion conſiſts of ſix hundred men, each rank will be one hundred and fifty.

The firſt rank is called the front of the battalion or ſquadron, and the laſt the rear. The files which bind it on the right and left are called the flanks.

DEPURATION, in pharmacy, is the ſeparating or freeing any fluid from all heterogeneous matter or feculencies, and thereby rendering every part of it of a ſimilar conſiſtence and appearance.

This operation is of three kinds, which differ as well in regard to the principles on which they depend, as in the manner of their execution.

The firſt and moſt ſimple manner of depuration is decantation. This is the ſeparating fluids from any heterogeneous matter, by means of the difference of their ſpecific gravity: but can, therefore, only be practiſed in the caſe of thoſe wherein there is ſuch a difference. It is performed, by only ſuffering the fluid to ſtand at reſt, till every thing that will ſubſide is collected at the bottom, and then pouring off from the ſediment, by a gradual inclination of the veſſel, all that part of the fluid which appears clear. This is the general method where ſmaller quantities are in queſtion; but in the caſe of larger, the greater part may with care be taken off by a proper bowl or diſh, and the reſt put into a leſſer veſſel, and ſeparated by inclination.

When fluids are to be freed from oils, or ſuch matter as floats, an inſtrument, called a tritorium or ſeparation funnel, is uſed. Theſe may be made of any form, by which the heavier fluid can be drawn off from below, and the oil or other lighter matter left in the veſſel: for the common kind one, and another proper for the greater quantities.

When oils whoſe viſcid conſiſtence is apt to detain impurities, and prevent their ſubſiding, are to be depurated, it is proper, previouſly to decantation, to let them ſtand ſome time within a moderate digeſting heat; by which means, being much more liquefied, they will frequently let fall a ſediment not otherwiſe ſeparable.

The ſecond method of depuration is by deſpumation. It is performed by adding whites of eggs, firſt well beat together, to the fluid to be clarified, and after a perfect commixture, making them coagulate by means of heat, and thereby carry to the ſurface all the heterogeneous matter, which is entangled by them in their coaleſcence. The impurities, together with the concreted whites of eggs, appearing as a ſcum on the ſurface of the fluid, is to be taken off with a ſpoon; this method is likewiſe called clarification.

The third manner of depuration is called filtration, or percolation, and is performed by paſſing, without preſſure, the fluid to be purified through ſtrainers of flannel, linen, cloth, or paper; which retaining the groſſer parts or feculencies, ſuffer only the clearer fluid to be tranſmitted.

When flannel is uſed, it is made into a bag in the form of a cone, and then called Hippocrates's ſleeve; the baſis whereof being turned upwards, and expanded by means of three or four poſts, from which it is made to hang, it is then filled with the fluid, which drops from the apex, or ſmall end, into a veſſel. This is moſtly uſed in the caſe of decoctions, extracts, and all gelatinous and ſaponaceous preparations, where extreme clearneſs is not neceſſary; where deſpumation has been previouſly uſed; or where the conſiſtence of the matter renders it unfit to paſs through paper. As the tenacious conſiſtence of many of theſe preparations renders their tranſmiſſion ever through flannel difficult; it is proper, in ſuch caſes, to filter them, while of a boiling heat, which can ſeldom do injury to thoſe of this kind, if care be taken to prevent their burning to the veſſel.

In ſolutions of ſalts, ſpirits, and other limpid fluids, where great tranſparency is expected, paper, or decantation ſubſequent to it through flannel, are alone capable of perfectly anſwering the end.

The manner of filtering through paper, is to put it into a tin or glaſs funnel, to whoſe form it is adapted in the manner of a lining, which very well ſerves the purpoſe where ſmall quantities are filtered; but for greater quantities this method is attended with great inconveniencies and delay, becauſe if large funnels be employed, the great column of fluid bearing on the middle of the paper, which is unſupported, and being forced with the incumbent weight to adapt itſelf to the form of the funnel, is much creaſed and bent, ſeldom fails to burſt it before any conſiderable quantity has paſſed through. This may be entirely remedied by ſubſtituting in the place of the funnel an earthen cullender, which every way ſupporting the paper, ſecures it from the violence of the incumbent preſſure, without in the leaſt impeding the paſſage of the fluid: and by this means large quantities may with great eaſe and expedition be diſpatched.

The filtering through paper, where the operation ſucceeds, never fails completely to anſwer the purpoſe; but there are many fluids, whoſe conſiſtence renders it impracticable: ſuch are all viſcid fluids, and thoſe that are in a great degree ſaponaceous, they either choaking the filter, or by their tenacity being kept from dividing ſo as to fall through the ſmall pores of the paper.

For theſe, therefore, a flannel muſt be employed, and even that in many caſes will fail, if the matter be not previouſly made more liquid by a boiling heat.

It is neceſſary to be careful in the choice of the kind of paper uſed for this purpoſe: there is none at preſent manufactured, whoſe texture and ſtrength are perfectly adapted to it; but amongſt the kinds that are to be produced, that commonly called bloom paper is much the beſt. The common ſorts are of ſo ſlight a ſubſtance, and have ſo little tenacity, except what is owing to gums, that as ſoon as they are wet, and the gum waſhed from them, they fall to pieces, ſo that neither the form of the cullender, nor any other artifice, can make them good.

Linen cloth is alſo uſed for this purpoſe, though but ſeldom, as it purifies with far leſs effect than woollen and has no advantage over it, unleſs when woollen i liable to be choaked and become impervious to the fluid as in the ſolutions of gums and gummy extracts: but i may with great advantage in ſome caſes be adapted t paper, where the relaxing quality of what is filtere weakens the texture of the latter; as happens in volatil ſpirits and all other ſaponaceous fluids. In this caſe th paper ſhould be put over it, and both together laid carefully into the cullender: and, by this expedient, the will be found to remedy each other's defects, and make filter proof againſt all common accidents.

There is another method of ſeparating water fro ſome particular kinds of ſubſtances, by the attraction o a pendent thread, which is called filtering.

In the depuration of ſome fluids, two of theſe ſever methods are uſed conjointly; as filtering through flanne may be practiſed after deſpumation, and is indeed generally more expeditious and effectual than ſcumming Filtering through paper, or flannel, is alſo proper to recover the fluid which remains mixed with the ſedimen after decantation: and decantation is ſometimes employed to make a perfect depuration of thoſe fluid which the flannel fails to make perfectly clear, ar whoſe viſcid conſiſtence forbids their being filtered throug paper.

There are ſome other methods of depuration occaſionally uſed; particularly the ſtraining with compreſſure, b means of a ſcrew-preſs.

DEPURATORY Fever, a name given by Sydenham to a fever which prevailed much in the years 166 1662, 1663, and 1664. He called it depuratory, becauſe he obſerved that nature regulated all the ſympto

The DESART, abſolutely ſo called, is that part of Arabia ſouth of the Holy Land, where the children of Iſrael wandered forty years.

DESCANT, in muſic, the art of compoſing in ſeveral parts. See COMPOSITION.

Deſcant is three-fold, viz. plain, figurative, and double.

Plain DESCANT is the ground-work and foundation of all muſical compoſitions, conſiſting altogether in the orderly placing of many concords, anſwering to ſimple counterpoint. See the article COUNTERPOINT.

Figurative or *Florid* DESCANT, is that part of an air of muſic, wherein ſome diſcords are concerned, as well, though not ſo much, as concords. This may be termed the ornamental and rhetorical part of muſic, in regard that there are introduced all the varieties of points, ſyncopes, diverſities of meaſures, and whatever is capable of adorning the compoſition.

DESCANT *Double*, is when the parts are ſo contrived, that the treble, or any high part, may be made the baſs; and, on the contrary, the baſs the treble. See the articles HARMONY, COUNTERPOINT, and MELODY.

DESCENDANT, in genealogy, a term relative to aſcendant, and applied to a perſon who is born or iſſued from ſome other referred to: thus, mankind are ſaid to be the deſcendants of Adam; and ſometimes the deſcendants of Noah.

DESCENSION, in aſtronomy, is either right or oblique.

Right DESCENSION, is an arch of the equinoctial, intercepted between the next equinoctial point and the interſection of the meridian, paſſing through the center of the object, at its ſetting, in a right ſphere.

Oblique DESCENSION, an arch of the equinoctial intercepted between the next equinoctial point and the horizon, paſſing through the center of the object, at its ſetting, in an oblique ſphere.

DESCENSIONAL DIFFERENCE, that between the right and oblique deſcenſion of any heavenly body. See the article DESCENSION.

DESCENT, in general, is the tendency of a body from a higher to a lower place; thus all bodies, unleſs otherwiſe determined by a force ſuperior to their gravity, deſcend towards the center of the earth: the planets too may be ſaid to deſcend from the aphelion to the perihelion of their orbits, as the moon does from the apogee to the perigee.

Heavy bodies, meeting with no reſiſtance, deſcend with an uniformly accelerated motion; for the laws of which ſee the article ACCELERATION.

DESCENT, or DISCENT, in law, an order or method whereby lands or tenements are derived to any man from his anceſtors.

DESCENT, in heraldry, is uſed to expreſs the coming down of any thing from above; as, a lion en deſcent, is a lion with his head towards the baſe points, and his heel towards one of the corners of the chief, as if he were leaping down from ſome high place.

DESCENTS, in fortification, are the holes, vaults, and hollow places made by undermining the ground.

The deſcent into the moat or ditch is a deep paſſage made through the eſplanade and covert-way, in form of a trench, whereof the upper-part is covered with madriers and clays, to ſecure the beſiegers from the enemy's fire. In wet ditches this trench is on a level with the ſurface of the water, but in dry ones it is ſunk as deep as the bottom of the ditch.

DESCRIBENT, in geometry, a line or ſurface, which, by moving parallel to itſelf, deſcribes a ſurface or ſolid.

DESCRIPTION is ſuch a ſtrong and beautiful repreſentation of a thing, as gives the reader a diſtinct view and ſatisfactory notion of it.

DESERTER, in a military ſenſe, a ſoldier who, by running away from his regiment or company, abandons the ſervice.

DESHACHE, in heraldry, is where a beaſt has its limbs ſeparated from its body, ſo that they ſtill remain on the eſcutcheon, with only a ſmall ſeparation from their natural places.

DESIDERATUM is uſed to ſignify a deſirable perfection in any art or ſcience: thus, it is a deſideratum with the blackſmith, to render iron fuſible by a gentle heat, and yet preſerve it hard enough for ordinary uſes; with the glaſs-man and looking-glaſs maker, to render glaſs malleable; with the clock-maker, to bring pendulums to be uſeful, where there are irregular motions; with the brazier and copper-ſmith, to make malleable ſolder; with the ſhipwright, to build veſſels that will ſail under water; with the diver, to procure manageable inſtruments for conveying freſh air to the bottom of the ſea, ſufficient for reſpiration and the burning of lights; with the aſſay-maſter, to melt or copel ores or metals immediately, without the uſe of bellows or furnaces; and with the carvers and joiners, to faſhion wood in moulds like plaſter of Paris, or burnt alabaſter, &c.

DESIGN, in a general ſenſe, the plan, order, repreſentation, or conſtruction of a building, book, painting, &c.

In building, the term ichnography may be uſed, when by deſign is only meant the plan of a building, or a flat figure drawn on paper: when ſome ſide or face of the building is raiſed from the ground, we may uſe the term orthography; and when both front and ſides are ſeen, in perſpective, we may call it ſcenography.

DESIGN, in the manufactories, expreſſes the figures wherewith the workman enriches his ſtuff, or ſilk, and which he copies after ſome painter, or eminent draughtſman, as in diaper, damaſk, and other flowered ſilk and tapeſtry, and the like.

In undertaking of ſuch kinds of figured ſtuffs, it is neceſſary, ſays M. Savary, that, before the firſt ſtroke of the ſhuttle, the whole deſign be repreſented on the threads of the warp; we do not mean in colours, but with an infinite number of little packthreads, which being diſpoſed ſo as to raiſe the threads of the warp, let the workmen ſee, from time to time, what kind of ſilk is to be put in the eye of the ſhuttle, for woof. This method of preparing the work is called reading the deſign, and reading the figure, which is performed in the following manner: A paper is provided, conſiderably broader than the ſtuff, and of a length proportionate to what is intended to be repreſented thereon. This they divide lengthwiſe, by as many black lines as there are intended threads in the warp; and croſs theſe lines, by others drawn breadthwiſe, which, with the former, make little equal ſquares: on the paper thus ſquared, the draughtſman deſigns his figures, and heightens them with colours, as he ſees fit. When the deſign is finiſhed, a workman reads it, while another lays it on the ſimblot. See the article SIMBLOT.

To read the deſign, is to tell the perſon who manages the loom, the number of ſquares, or threads, compriſed in the ſpace he is reading, intimating at the ſame time whether it is ground or figure.

To put what is read on the ſimblot, is to faſten little ſtrings to the ſeveral packthreads, which are to raiſe the threads named; and thus they continue to do till the whole deſign is read.

Every piece being compoſed of ſeveral repetitions of the ſame deſign, when the whole deſign is drawn, the drawer, to re-begin the deſign a-freſh, has nothing to do but to raiſe the little ſtrings, with ſlip-knots, to the top of the ſimblot, which he had let down to the bottom: this he is to repeat as often as is neceſſary till the whole be manufactured.

The ribbon-weavers have likewiſe a deſign, but far more ſimple than that now deſcribed. It is drawn on paper with lines and ſquares, repreſenting the threads of the warp and woof. But inſtead of lines, whereof the figures of the former conſiſt, theſe are conſtituted of points only, or dots, placed in certain of the little ſquares, formed by the interſection of the lines. Theſe points mark the threads of the warp that are to be raiſed, and the ſpaces left blank denote the threads that are to keep their ſituation: the reſt is managed as in the former.

DESIGN is alſo uſed, in painting, for the firſt idea of a large work, drawn roughly, and in little, with an intention to be executed and finiſhed in large. The art of painting has been by ſome of the greateſt maſters divided into the deſign, or draught, the proportion, the expreſſion, the claro-obſcuro, the ordonnance, the colouring, and the perſpective.

Design, in painting, is the ſimple contour, or out lines of the figures intended to be repreſented, or the lines that terminate and circumſcribe them; ſuch deſign is ſometimes drawn in crayons, or ink, without any ſhadows at all; ſometimes it is hatched, that is, the ſhadows are expreſſed by ſenſible outlines, uſually drawn a croſs each other with the pen, crayon, or graver. Sometimes, again, the ſhadows are done with the crayon, rubbed ſo as that there do not appear any lines: at other times, the grains or ſtrokes of the crayon appear, as not being rubbed: ſometimes the deſign is waſhed, that is, the ſhadows are done with a pencil in Indian ink, or ſome other liquor; and ſometimes the deſign is coloured, that is, colours are laid on much like thoſe intended for the grand work.

The eſſential requiſites of a deſign are correctneſs, good taſte, elegance, character, diverſity, expreſſion, and perſpective. Correctneſs depends on the juſtneſs of the proportions, and knowlege of anatomy. Taſte is a certain manner of correctneſs peculiar to one's ſelf, derived either from nature, maſters, or ſtudies, or all of them united. Elegance gives a delicacy that not only ſtrikes perſons of judgment, but communicates an agreeableneſs that pleaſes univerſally. The character is what is peculiar to each object, wherein there muſt be diverſity, inſomuch that every thing has its peculiar character to diſtinguiſh it. The expreſſion is the repreſentation of an object, according to the circumſtances it is ſuppoſed to be in. Perſpective is the repreſentation of the parts of a painting, or a figure, according to the ſituation they are in with regard to the point of ſight. See the article Drawing, &c.

The deſign or draught, is a part of the greateſt import and extent in painting. It is acquired chiefly by genius and application, rules being of leſs avail here than in any other branches of the art, as colouring, &c. The principal rules that regard deſign are, that novices accuſtom themſelves to copy good originals at firſt ſight; not to uſe ſquares in drawing, leſt they ſtint and confine their judgment; to deſign well from life, before they practiſe perſpective; to learn to adjuſt the ſize of their figures to the viſual angle, and the diſtance of the eye from the mode or object; to mark out all the parts of their deſign before they begin to ſhade; to make their contours in great pieces, without taking notice of the little muſcles, and other breaks; to make themſelves maſters of the rules o perſpective; to obſerve the perpendicular, parallel, and diſtance of every ſtroke; to compare and oppoſe the parts that meet and traverſe the perpendicular, ſo as to form a kind of ſquare in the mind, which is the great and almoſt the only rule of deſigning juſtly; to have a regard no only to the model, but to the parts already deſigned, there being no ſuch thing as deſigning with ſtrict juſtneſs, bu by comparing and proportioning every part to the firſt All the other rules relate to perſpective. See the articl Perspective.

DESIGNING, the art of delineating or drawing th appearance of natural objects, by lines, on a plane.

Mechanical Method of Designing. There are ſevera methods of deſigning mechanically. The following i the method of the learned Sir Chriſtopher Wren, and ma be put in practice with great eaſe.

A is a ſmall ſight, with a ſhort arm B, (plate LII *fig.* 2.) which may be turned round about, and move up and down the ſmall cylinder C D, which is ſcrewe into the piece E D, at D; this piece E D moving roun about the center E, by which means the ſight may b removed either towards E or F.

E F is a ruler faſtened on the two rulers G G, whic rulers ſerve both to keep the ſquare frame S S S S perpen dicular, and, by their ſliding through the ſquare hole T T, they ſerve to ſtay the ſight, either farther from, c nearer to, the ſaid frame; on which frame is ſtuck or with wax, the paper O O O O, whereon the picture to be drawn by the pen I. The pen I is, by a ſmall bra handle V, ſo fixed to the ruler H H, that the point I ma be kept very firm, ſo as always to touch the paper. H is a ruler that is conſtantly, by means of the ſmall ſtring *a a a*, *b b b*, moved horizontally, or parallel to itſelf;

up with new fleſh, all ulcerations and foulneſſes occaſioned thereby, whether internal or external. To do this internally, the medicine is ſuppoſed to maintain its primary properties, till it arrives at the place of action, where it is intitled to the appellation of a detergent and vulnerary, by its adheſive quality, which conſiſts in the comparative largeneſs of its ſurface, and flexibility of its component parts: for by this it readily adheres to the ſlough of ulcerous exudations, which are eaſily carried along with the medicine; and when this is done, what was inſtrumental in deterging, will afterwards ſtick to the cutaneous filaments, till, by the protruſion of proper nouriſhment, the ulcer is healed; and, in like manner, the operation of external ſubſtances are accounted for: only this is to be taken notice of, that internally whatſoever mixes with the animal fluids, will be the firſt ſeparated and left behind; for all thoſe parts which are ſpecifically heavier, will move nearer the axis of the canals, becauſe their momenta are greater, and will carry them nearly in a ſtraight line: but the lighter parts will be always juſtled to the ſides, where they ſooner meet with out-lets, or are ſtruck into the eroded cavities, in which they adhere and make part of the ſubſtance. Thus it is eaſy to conceive how an increaſe of thoſe qualities of activity and adheſion may make a medicine ariſe to the greateſt efficacy in this reſpect, even ſo far, as to fetch off the membranes and capillary veſſels. *Quincy.*

DETERMINATE Problem, in geometry, that which has but one, or, at leaſt, a limited number of anſwers: as the following problem, which has but one only ſolution, viz. To deſcribe an iſoſceles triangle on a given line, whoſe angles at the baſe ſhall be double that at the vertex. But the following hath two ſolutions, viz. To find an iſoſceles triangle, whoſe area and perimeter are given.

DETERMINATION, in mechanics, ſignifies much the ſame with the tendency or direction of a body in motion.

Determination, among ſchool-divines, is an act of divine power, limiting the agency of ſecond cauſes, in every inſtance, to what the Deity predeſtinated concerning them. See Predestination.

DETINUE, in law, a writ or action that lies againſt one who has got goods or other things delivered to him to keep, and afterwards refuſes to deliver them.

Detinue *of Charters.* An action for detinue lies for deeds and charters which make the title to lands.

DETONATION, in chemiſtry, the noiſe and exploſion which any ſubſtance makes upon the application of fire to it. It is alſo called fulmination.

DETRAHENS Quadratus, in anatomy, a muſcle otherwiſe called platyſma. See the article Platysma.

DETRANCHE, in heraldry, a line bendwiſe, proceeding always from the dexter ſide, but not from the very angle, diagonally athwart the ſhield.

DEVENSHRING, or Denshring, a term uſed in many parts of England for burning of land. See Burning *of Land.*

DEVIATION, in old aſtronomy, ſignified the motion of the deferent, or excentric, whereby it advanced to, or receded from, the ecliptic.

DEVIL, Διάβολος, an evil angel, one of thoſe celeſtial ſpirits caſt down from heaven, for pretending to equal himſelf with God.

Devil-in-a-Bush, a plant called by authors nigella. See the article Nigella.

Devil's-Bit, the ſame with the ſcabious of botaniſts. See the article Scabious.

Devil's-Milk, a ſpecies of tithymal, or ſpurge. See the article Tithymal.

DEVISE, or Device, in heraldry, painting, and ſculpture, any emblem uſed to repreſent a certain family, perſon, action, or quality; with a ſuitable motto, applied in a figurative ſenſe. See Motto.

The eſſence of a deviſe conſiſts in the metaphorical ſimilitude between the things repreſenting and repreſented.

Devise is frequently alſo uſed for a cipher. See the article Cipher.

Devise, in law, the act whereby a perſon bequeaths his lands or tenements to another, by his laſt will and teſtament.

DEVOTION, *Devotio*, a ſincere ardent worſhip of the Deity.

Devotion, among the Romans, was a kind of ſacrifice, or ceremony, whereby they conſecrated themſelves to the ſervice of ſome perſon.

DEVOURING, in heraldry, is when fiſhes are borne in an eſcutcheon in a feeding poſture; for they ſwallow all the meat whole.

DEVUIDER, in the manege, is applied to a horſe that, upon working upon volts, makes his ſhoulders go too faſt for the croupe to follow; ſo that, inſtead of going upon two heads as he ought, he endeavours to go only upon one.

DEUILLE's *Piſton*, in hydraulics, a piſton without friction, invented by Meſſieurs Goſſet and de la Deuille, and ſucceſsfully made uſe of in the king of France's garden at Paris.

This piſton may be made as large as you pleaſe, even to have thirty-ſix inches diameter; but we ſhall only give fifteen to that we are going to deſcribe, this bigneſs ſeeming moſt convenient for the reaſons that will appear, as we deſcribe this piſton. As it is to act in a pump different from thoſe commonly deſcribed, we will ſhew in what it conſiſts. It is made of two boards of oak or elm, twenty inches diameter, and five inches thick: in the middle of each of theſe boards you muſt cut a hollow cylindrical cavity fifteen inches diameter, and two and an half deep, which forms two boxes, which muſt be applied to one another with their hollows together; their profile taken diametrically, is repreſented by each of the rectangles ABCD, and EFHG. (plate LII. *fig.* 3.)

The piſton is made of a circular board YZ, an inch thick, whoſe diameter muſt be a little leſs than that of the hollow TOQV, to facilitate its play: this board is fixed to a great circle of leather (or to ſeveral, when one is not ſtrong enough) in ſuch manner that the leather may extend all round beyond it ſix or ſeven inches; then you muſt put the board YZ in the bottom of the box STVX, and what exceeds of the leather muſt be folded up all round the edge EXG of the ſame box; then you put down the other box upon the firſt, ſo as to ſqueeze the leather between; and that it may be preſſed the more ſtrongly, ſo that the two boxes may make but one, they are drawn together by means of ſeveral iron pins 17, 18, whoſe ends are cut into ſcrews, to fit into nuts; then the piſton makes a ſort of a purſe 3, 4, 5, 6, which turns inſide out every time the bottom YZ is drawn upwards.

At the bottom of this purſe there is an hole L, covered with a valve K, which, when it is raiſed, comes to lean againſt the handle MWM, which handle is faſtened to the rod N, that works the piſton up and down; for doing of which there is another hole 9, 10, in the bottom of the upper-box, which anſwers the riſing pipe 13, 14, in which the rod N goes up: this hole is made ſpreading downwards, that the moveable board may apply itſelf cloſe to the top OQ, when the piſton riſes. In the lower bottom of the box there is another hole 19, 20, which anſwers to the ſucking pipe 15, 16, that ſtands in the water to be raiſed; this hole is covered with a valve I, as uſual.

When the piſton riſes, the water from the ſucking pipe opens the valve I, and paſſes into the hollow that is made in an height of four inches, which is all the play that the piſton ought to have, not to weaken the leather too much, which would not hold out long, if it had too long a ſtroke; whereas, having at moſt but two inches and an half to riſe from 5 to X, it wears but little: when the piſton comes down, the valve I ſhuts again, the other K opens, and the water which is between the bottom TV, and the leather 3, 4, 5, 6, goes through the hole L, and comes into the ſpace OPYZQ; whence it is lifted into the riſing or forcing pipe: thus you ſee that the piſton, always moving between the water above, and that below, has no friction. We ſhall add, that, when it is made of good leather, it may be continually worked for three or four months, without repairing, as experience has ſhewn in thoſe pumps, which Meſſieurs Goſſet and de la Deuille had made for draining the mines in Brittany.

The only fault to be found with this piſton is, that of whatſoever diameter the riſing pipe 13 and 14 is, the power is always loaded with the weight of a column of water, whoſe baſe is the circle OQ, and height the elevation of the reſervoir above the ſpring; it is true, that one may increaſe the diameter of that pipe, and decreaſe that of the piſton, that, when they are equal, the power may only raiſe its natural weight.

It may yet perhaps be objected, that this piſton, having ſo ſhort a ſtroke, will give but little water every time; but that is not a fault, ſince one may make the ſtrokes more frequent; ſo that what may be loſt on one hand may be gained on the other, and as much water be raiſed as if the ſtroke were longer.

As the rod of the piſton goes through the riſing (or forcing) pipe, water may not be raiſed to a conſiderable height by this pump, yet the rod of the pump, erected in the king's garden, is at leaſt twenty-five feet long; and if the ſame length be given to the ſucking pipe, one may however raiſe water fifty feet above its ſpring, in a very plain and cheap way: for if you make uſe of wood, ſuch a pump will coſt under ten piſtoles; and that ſerves, upon many occaſions, where a pump of great expence would raiſe no more water with the ſame power.

DEUNX, in Roman antiquity, eleven ounces, or $\frac{11}{12}$ parts of the Libra. See LIBRA.

DEUS, GOD, among divines and philoſophers. See the article GOD.

DEUTERO-CANONICAL, in theology, a term applied to certain books of Scripture which were added to the canon after the reſt; either becauſe they were not wrote till after the canon was compiled, or becauſe of ſome debate in regard to their canonicity.

The deutero-canonical books in the modern canon, are the books of Eſther, either the whole, or at leaſt the ſeven laſt chapters of it; the epiſtle to the Hebrews, thoſe of James and Jude; the ſecond of St. Peter, the ſecond and third of St. John, and the Revelations. The deutero-canonical parts of books are the hymn of the Three Children, the prayer of Azariah, the hiſtories of Suſannah, of Bel and the Dragon, the laſt chapter of St. Mark, the bloody ſweat and appearance of the angel, related in Luke xxii. and the hiſtory of the adulterous woman in John viii.

DEUTERONOMY, a canonical book of the Old Teſtament, and the laſt of the pentateuch of Moſes.

This book was called Deuteronomy by the ſeventy Greek tranſlators, as being a recapitulation of the laws before delivered at large.

DEUTEROSIS, the Greek name by which the Jews called their miſchnah, or ſecond law.

DEW, a light, thin, inſenſible rain or miſt, falling on the earth while the ſun is below the horizon.

In the ſummer ſeaſon, when the weather is fair, and very dry, and the earth's ſurface has for a conſiderable time been parched with the great heat of the ſun, then not only the watery, but likewiſe other leſs volatile particles, as the oily and ſaline, are, by the power of the ſolar rays, carried up into the air, and fill that part of it which lies neareſt to the ſurface of the earth; and ſo long as theſe exhalations are kept in agitation by the heat of the ſun, ſo long nothing of them appears to the eye. But as ſoon as the ſolar heat, which at three in the afternoon is the greateſt, begins to remit, the air not long after begins to grow cool, though the earth, which retains the heat communicated to it by the ſun a thouſand times longer than the air, being ſtill hot, continues to exhale the agitated corpuſcles; by which means there is collected a white, denſe, vapour, which is cool above, but ſtill continues warm below. This vapour, therefore, appears firſt in ditches, and watery or marſhy places, whence diſperſing itſelf by degrees, it covers the face of the earth, in the evening and night time, with a cloud, conſiſting of this kind of particles, which in the morning is again diſſipated by the heat of the riſing ſun. By all this it appears, that dew is a very compound liquid; ſo that nothing can be aſſerted of its nature, which in every circumſtance would hold true. In gravel-pits, for inſtance, and in high, dry, healthy grounds of a large extent, there is collected but a very ſmall quantity of this vapour, and that almoſt entirely watery; whilſt that which is collected about ſtanding waters, fens, marſhes, and fat bituminous grounds, abounding with putrified fiſh, and other animals, is of a quite different nature, and very often pernicious to mankind. It is no wonder, therefore, that the chemiſts, in the artificial reſolution of dew, have met with ſuch contrary principles, and written ſo differently on the ſubject, that you can ſcarcely find two of them that give the ſame account of it. Dew, however, is a very ſharp, ſaponaceous, pinguious liquid, abounding, it is true, with a good deal of nouriſhment for vegetables. A dew too collected in a certain part of the earth has yielded by diſtillation a liquid that impreſſed upon glaſs the lively colours of the rainbow, which could neither be removed by friction, an alkaline lixivium, or aqua-fortis: and this liquor was inflammable like ſpirits of wine, as appears from the chemical experiments related in tom. i. of the Republic of Letters. And again, diſtilled dew, digeſted for eight days in a gentle heat, and by repeated diſtillation rendered ſix times more ſubtile, is ſaid to have broke three glaſs veſſels, and to have remained perfectly inſipid, though it was ſo very thin, that it reſembled pure ſpirit. And farther, by the Britiſh obſervations in the Philoſophical Tranſactions, dew is deſcribed as being like butter, of a yellowiſh white colour, ſoft, melting by being rubbed upon the hand, and growing dry by a moderate heat; of a very fœtid ſmell in the winter; and in the ſpring, particularly, produced in the night time, in pretty large lumps. But the nature of dew is likewiſe ſurpriſingly various, according to the different diſpoſition of the weather, and according to the various and ſucceſſive changes of the meteors in the air: for hence it comes to paſs that the very minute ſeeds of ſmall plants, and the inviſible eggs of the ſmalleſt animalcula, are mixed with it, together with an infinite number of other things; which being all digeſted, fermented, putrified, and diſtilled together, yield at different times principles of very different natures, and hence lead the chemiſts into very extraordinary opinions. The principal part, therefore, of dew is water; the reſt, on account of their manifold variety, cannot poſſibly be deſcribed. *Boerhaave's Chem.*

Sun DEW, *Ros Solis*, in botany. See the article ROS SOLIS.

DEXTANS, in Roman antiquity, ten ounces, or $\frac{10}{12}$ of their libra. See the article LIBRA.

DEXTER, in heraldry, an appellation given to whatever belongs to the right ſide of a ſhield, or coat of arms: thus we ſay, bend-dexter, dexter-point, &c.

DEY, in matters of government, the ſovereign prince of Algiers, anſwering to the bey of Tunis.

DIABETES, from διαβαινω, to paſs off, in phyſic, that diſcharge of urine, when any liquor, ſoon after it is drank, is immoderately, and without undergoing almoſt any change, evacuated crude, and under the appearance of water.

In this diſorder the patient is continually afflicted with an inſatiable thirſt, that cannot be removed by drinking the moſt liberal draughts. The liquor drank is often diſcharged by urine, in larger quantities than it was taken into the ſtomach. Thus the whole body is, by this means, conſumed, and as it were diſſolved; though, in ſome patients, the loins, the thighs, the teſtes, and eſpecially the feet, become a little turgid, and a certain heat is perceived in the inteſtines.

A diabetes is a diſeaſe of the chronical kind, and depends upon the ſtate of the kidnies: when recent, it ſometimes admits of a cure; but when inveterate, and of long ſtanding, it becomes incurable.

According to Liſter, nothing more effectually contributes to the cure of this diſorder, than all preparations of almonds, and a milk diet; and he himſelf gives us an inſtance of one cured of it by drinking as much wine, boiled with ginger, as his ſtrength and condition would admit of; allowing him, at proper intervals, draughts of milk and water, to allay his thirſt.

According to Willis, few or none at all have been obſerved to be cured of a diabetes by aſtringents; and this practitioner, as he himſelf informs us, often preſcribed, with ſucceſs, the tincture of antimony, and a ſolution of quick-lime in water, together with ſaſſafras, aniſeeds, raiſins, and liquorice.

As to the cure of the diabetes by Briſtol waters, ſee the article BRISTOL *Water*.

DIACAUSTIC Curve, or cauſtic by refraction, a ſpecies of curves generated in the following manner.

If you imagine an infinite number of rays B A, B M, B D, &c. (plate LII. *fig.* 4.) iſſuing from the ſame luminous point B, to be refracted to or from the perpendicular M C by the given curve A M D; and ſo that C E, the ſines of the angles of incidence C M E, be always to C G, the ſines of the refracted angles C M G, in a given ratio; the curve H F N, which touches all the refracted rays A H, M F, D N, &c. is called the diacauſtic, or cauſtic by refraction.

The word is derived from the Greek, *δια*, through, and *καιω*, to burn.

DIACELTATESSON, in chemiſtry, a name given by Van Helmont, to a purging preparation procured from the fixed flowers of antimony.

DIACENTROS, a term uſed by Kepler, for the leſſer diameter of a planet's orbit.

DIACHALCITIS, in ſurgery and pharmacy, a plaſter compoſed of oil, axungia, and chalcitis, which formerly uſed to be applied after the amputation of a cancer, and on many other occaſions.

DIACHYLON, in pharmacy, an emollient digeſtive plaſter, compoſed of the mucilages or juices of certain herbs, litharge, and oil.

The word is formed from the Greek, *δια*, and *χυλος*, juice.

DIACODIUM, in pharmacy, a ſyrup prepared from the heads of poppies.

The word is formed from the Greek, *δια*, and *κωδεια*, a poppy-head.

DIACOPE, in grammar, the ſame with tmeſis. See the article Tmesis.

DIACOUSTICS, or Diaphonics, is the conſideration of the properties of refracted ſound, as it paſſes through different mediums.

The word is derived from the Greek *δια*, through, and *ακουω*, to hear.

DIADELPHIA, in the Linnæan ſyſtem of botany, a claſs of plants, the ſeventeenth in order; comprehending all thoſe with papilionaceous and hermaphrodite flowers and leguminous ſeed-veſſels. See the articles Papilionaceous and Legumen.

The diſtinguiſhing characteriſtic of this claſs is, that the ſtamina adhere together; forming two diſſimilar bodies or filaments, the one ſtanding above the piſtil, and the other ſurrounding it.

The lower part of this laſt is membranaceous, and of a cylindrical figure, only open above; but towards the top it is divided into ſeveral ſubulated bodies, whereof thoſe in the middle are alternately longer and ſhorter by pairs. The upper filament is ſingle, altogether ſubulated, and covers the ſlit of the cylindraceous part of the under one. Add to this, that the piſtil is ſingle; its germ oblong, and rounded; its ſtyle, ſubulatofiliform; and the ſtigma covered with down, of the length of the ſtyle, and lying directly below the antheræ of the ſtamina.

This is a very natural claſs, and comprehends peaſe, beans, vetches, liquorice, and a great many other genera. See the articles Pease, Beans, &c.

DIADEM, in antiquity, a head band, or fillet, worn by kings, as a badge of their royalty. It was made of ſilk, thread, or wool, and tied round the temples and forehead, the ends being tied behind, and let fall on the neck. It was uſually white, and quite plain, though ſometimes embroidered with gold, and ſet with pearls and precious ſtones. In latter times it came to be twiſted round crowns, laurels, &c. and even appears to have been worn on divers parts of the body. See Crown.

Diadem, in heraldry, is applied to certain circles, or rims, ſerving to incloſe the crowns of ſovereign princes, and to bear the globe and croſs, or the fleur de luces for their creſt. The crowns of kings are bound, ſome with a greater, and ſome with a leſs number of diadems. The bandage about the heads of Moors on ſhields is alſo called diadem, in blazoning.

DIADROME, the ſame with vibration, or ſwing of a pendulum. See Vibration and Pendulum.

DIÆRESIS, in ſurgery, an operation ſerving to divide and ſeparate the part, when the continuity is a hindrance to the cure. Some profeſſors divide ſurgery into ſix parts, aſſigning to each Greek names, of whic is one.

Diæresis, in medicine, is the conſumir veſſels of an animal body, when from ſome cauſe certain paſſages are made, which natur not to have been; or certain natural paſſages a beyond their ordinary dimenſions, ſo that the which ought to have been contained in the veſſ vaſate or run out.

Diæresis, in grammar, the diviſion of on into two, which is uſually noted by two poin letter, as aulaï inſtead of aulæ, diſſolüenda venda.

Diæresis is alſo the ſame with what is called tmeſis. See Tmesis.

DIAGLYPHIC, the art of cutting or eng gures on metals, ſuch as ſeals, intaglios, matric ters, &c. or coins for medals. See the articles ing and Sculpture.

DIAGNOSTIC, from the Greek *δια*, through, and *γινωσκω*, to know, is that judgm diſeaſe that is taken from the preſent ſymptoms dition of the patient.

DIAGONAL, from the Greek *δια*, and *γωνι* in geometry, is a line drawn acroſs from angle in any figure; and is by ſome called the diamet Diameter.

DIAGRAM, in geometry, a ſcheme for ex and demonſtrating the properties of any figure, triangle, ſquare, circle, &c. See the articles Tr Square, &c.

Diagram, among ancient muſicians, the ſa the ſcale of the moderns. See the article Scale.

DIAGRADIUM, in pharmacy, a prepar ſcammony, invented by Galen; it conſiſts in the ſcammony in a quince, but is at preſent uſed.

DIAL, or Sun-Dial, an inſtrument ſerving ſure time by means of the ſhadow of the ſun.

The word is formed from the Latin, *dies*, day, indicating the hour of the day.

The ancients alſo call it ſciathericum, from its the hour by the ſhadow.

Sun-dials are differently denominated, according different ſituation, and the figure of the ſurfaces they are deſcribed; as horizontal, vertical, equi polar, direct, erect, declining, inclining, reclini lindrical, &c.

To draw the hour-lines upon a horizontal Draw the right-line 6 A 6 (plate LII. *fig.* 5.) eaſt and weſt-line of the dial, or the hour-line of the middle of this line ſet off A *a* equal to the p thickneſs of your ſtyle; through A and *a*, draw *cae*, both perpendicular to 6 A 6, and let G C H be thereto; make the angle C A B equal to the give tude, and upon A B let fall the perpendicular C A C produced, take C F equal to C D, then m angles C F 1, C F 2, C F 3, &c. equal to 15°, 3 &c. reſpectively, and draw A 1, A 2, A 3, &c. hour lines of one, two, three, &c. after noon. *c* 11, *c* 10, *c* 9, &c. reſpectively equal to C 1, C 2, C and draw *a* 11, *a* 10, *a* 9, &c. for the hour-lines of ten, nine, &c. before noon.

Note. The hour-lines of four and five, whoſ ſections with G C H fall without the plane of th may be otherwiſe drawn in the following m Take A *f* equal to the exceſs of A C above C I make the angles 6 *f* 5, 6 *f* 4, equal to 15°, 30°, tively; alſo from the points 4, 5, where the lines interſect K 3, parallel to C E, draw A 4, A 5, hour-lines of four and five; from which, by takin and 6, 8, equal to 6, 5, and 6, 4, &c. and drawin A 8, &c. you will alſo have the hour-lines of ſev eight.

The upper edge of the ſtyle, when the dial is pl its proper poſition, will be parallel to the earth's for the line 6 A 6, being the eaſt and weſt-line dial, the line C A E, perpendicular thereto, will th be the north and ſouth-line with regard to the cen or in reſpect of that ſide of the ſtyle, by the ſha which the hours after noon are pointed out; and it

PLATE LII.

Fig. 1. Declination

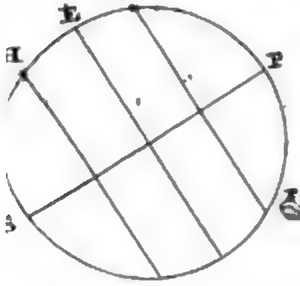
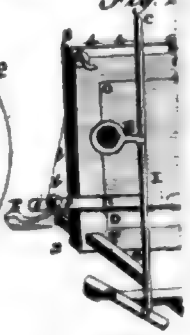


Fig. 2



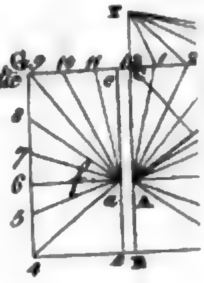

F
G
9
10
11
8
7
6
5
4
A
B

Fig. 4. Diacaustic

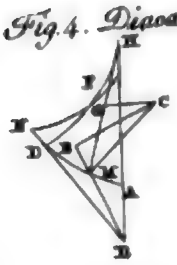
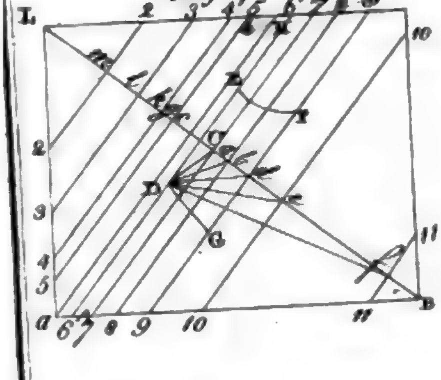


Fig. 7.


L
2
3
4
5
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8
9
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m
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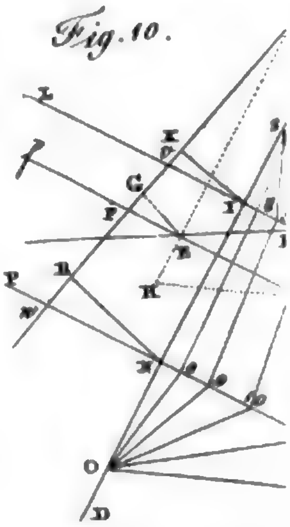
11

Fig. 10.


L
K
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H
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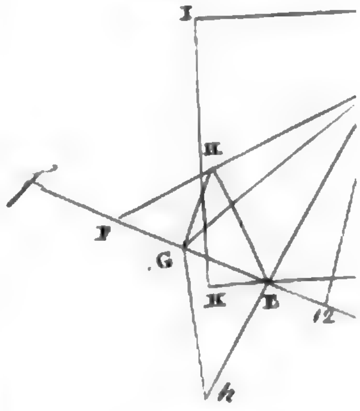
O
D



dent that, as A*a* expreſſes the thickneſs of the ſtyle, the line *cae* will be the north and ſouth line of the dial, with regard to the center *a*, anſwering to the morning ſide of the ſtyle. Moreover, ſince the angle C A B is equal to the latitude of the place or the elevation of the pole, by conſtruction it is evident, that when the ſtyle C A B is erected perpendicular to the plane of the horizon, on A *ac* C, the upper-edge thereof will paſs through the pole of the world, and ſo be parallel to the earth's axis.

To draw the hour-lines upon an erect ſouth-dial, for any given north-latitude; or an erect north dial for any ſouth-latitude; draw the right-line 6 A 6 for the eaſt and weſt-line of the dial (*fig.* 6.) or the hour-line of ſix; in the middle of this line ſet off A *a* equal to the aſſigned thickneſs of your ſtyle, and from A, *a*, draw A C, *ac*, both perpendicular to 6 A 6; alſo let G C H be parallel thereto: make the angle C A B equal to the complement of the latitude, and upon A B let fall the perpendicular C D; then proceed as in the horizontal dial.

To ſhew that the upper-edge of the ſtyle, when the dial is placed in its proper poſition, will be parallel to the earth's axis, we may obſerve, in the firſt place, that the line 6 A 6 being the eaſt and weſt-line of the dial, and parallel to the plane of the horizon, the line A C perpendicular thereto when the plane of the dial is erect, will alſo be perpendicular to the horizon: therefore, when the plane of the ſtyle, repreſented by the triangle A C B, is erected perpendicular to the plane of the dial, on the line A C, it will coincide with the meridian (being perpendicular to the plane of the dial repreſented by the prime vertical): and ſo the angle C B A being equal to the given latitude, or the elevation of the pole, (by conſtruction) it is evident A B, the upper-edge of the ſtyle when produced, will paſs through the pole of the world, and ſo be parallel to the earth's axis.

Note. An erect north-dial, for a north-latitude, is conſtructed exactly in the ſame manner as an erect ſouth-dial; the only difference being in the poſition of the dial; in the former caſe the line G B being made the upper-edge of the dial inſtead of the lower.

The ſame may be obſerved with reſpect to an erect ſouth dial, for a ſouth-latitude.

To draw the hour-lines upon an erect eaſt-dial, for any propoſed north-latitude; or an erect weſt-dial, for any ſouth-latitude.

On the propoſed plane draw the right line A B (*fig.* 7.) for the horizontal-line of the dial; make the angle L B A equal to the complement of latitude, and perpendicular to B L, draw A C H for the hour-line of ſix; take C *c* equal to the propoſed thickneſs of your ſtyle, and parallel to A H draw *acb*; then, having aſſumed D C at pleaſure, make the angles C D *a*, C D *b*, C D *d*, &c. equal to 15°, 30°, 45°, &c. reſpectively, and through the points *a*, *b*, *d*, &c. parallel to A C H, draw the lines 7 *a* 7, 8 *b* 8, 9 *d* 9, &c. for the hour-lines of ſeven, eight, nine, &c. alſo take *cg*, *ck*, *cl*, &c. equal to C *a*, C *b*, C *d*, &c. and through *g*, *k*, *l*, &c. parallel to *acb*, draw the lines 5 *g* 5, 4 *k* 4, 3 *l* 3, &c. for the hour-lines of five, four, three, &c. The ſtyle in this caſe will be repreſented by the plane H 9 9 A, or D G F E, whoſe upper-edge G F produced will paſs through the pole of the world.

For the dial being placed in its proper poſition, the plane thereof will coincide with the meridian, and the line B A with the horizon; whence the angle B A C being equal to the propoſed elevation of the pole by conſtruction, the line A C H will, it is evident, point directly to the ſaid pole, and therefore be parallel to the earth's axis: therefore G F being parallel to A H, it muſt alſo be parallel to the earth's axis.

Note. An erect weſt-dial, for a north-latitude, is conſtructed exactly in the ſame manner as an erect eaſt-dial, provided that, inſtead of beginning the conſtruction from the right-end B of the plane, you begin at the left-end A; and that the figures expreſſing the hours of *one*, two, three, &c. in the afternoon, be placed between the ſaid left-end and the hour-line of ſix.

The ſame may be obſerved with regard to an erect eaſt-dial for any ſouth-latitude.

To draw the hour-lines upon a direct ſouth reclining dial, for any north-latitude, or a direct north reclining dial, for any ſouth-latitude.

Draw the right-line 6 A 6 (*fig.* 5.) for the eaſt and weſt-line of the dial, or the hour-line of ſix; in the middle of this line ſet off A *a* equal to the propoſed thickneſs of your ſtyle; through A, *a*, draw C A E, *cae*, both perpendicular to 6 A 6, and let G C H be parallel thereto; make the angle C A B equal to the exceſs of the reclination above the complement of latitude, and upon A B let fall the perpendicular C D; in A C produced take CF=CD, then proceed as with a horizontal dial.

To demonſtrate that the upper-edge of the ſtyle, when the dial is placed in its proper poſition, will be parallel to the earth's axis, we may obſerve in the firſt place, that the line 6 A 6, being the eaſt and weſt-line of the dial, and parallel to the horizon, will be perpendicular to the plane of the meridian; whence the line C A E, perpendicular to 6 A 6, will be the meridian line of the dial, and the plane of the ſtyle A C B, when erected perpendicular to the plane of the dial on the line A C, will coincide with the plane of the meridian. Moreover, the angle C A B being here equal to the exceſs of the reclination above the pole's diſtance from the zenith, it is evident that the difference between the reclination and the ſaid angle C A B will be equal to the diſtance of the pole from the zenith; and conſequently A B, when produced, will paſs through the pole, and ſo be parallel to the earth's axis.

Note. The pole elevated above the horizon of the place is alſo elevated above the plane of the dial: but when the reclination is leſs than the pole's diſtance from the zenith, the oppoſite pole will be elevated: in ſuch caſe the height of the ſtyle (C A B) muſt be ſet off, on the contrary ſide of the line 6 A 6, from the lower part of the meridian A E, which will then be the hour-line of twelve.

If it be required to deſcribe a north reclining dial for a north latitude, or a ſouth reclining one for a ſouth-latitude, the method of conſtruction will ſtill be the ſame; only, inſtead of taking the angle C A B equal to the difference between the reclination and the complement of latitude, we muſt take it equal to the ſum of them.

If the plane of a north reclining dial be inverted, the dial will then become a ſouth inclining dial, whoſe inclination is the complement of the reclination of the dial ſo inverted.

In like manner, a ſouth reclining dial will become a north reclining one.

To deſcribe the hour-lines upon a direct eaſt reclining dial, for any north-latitude; or a direct weſt reclining dial, for any ſouth-latitude. — Draw the right line I K 12 (*fig.* 8.) for the north and ſouth-line of the dial, or the hour-line of 12; perpendicular to this draw K C: make E K C equal to the given reclination, and perpendicular to K C draw C E L; take KM=KE, and make the angle A M K equal to the complement of the propoſed latitude; join A, C, and perpendicular thereto draw G C H, in which ſet off C *c* equal to the propoſed thickneſs of your ſtyle; through *c* draw *ca* perpendicular to G H, and let A *a* be parallel thereto: make CB=CE, and joining A, B, and K, B, draw C D perpendicular to A B; in A C and *ac*, produced, take C F and *cf*, each equal to C D, and from F, to the point where G H interſects I K, draw F 12; then make the angles 12 F 11, 11 F 10, 10 F 9, 9 F 8, each equal to 15°, and the angle *cf* 7 equal to the exceſs of 15°, above the angle C F 8: alſo make the angles 7 *f* 6, 6 *f* 5, &c. each equal to 15°, and draw the right lines A 11, A 10, A 9, &c. for the hour-lines of 11, 10, 9. &c.

To ſhew that the upper edge of the ſtyle, when the dial is placed in its proper poſition, will be parallel to the earth's axis, we may obſerve in the firſt place, that the plane of the triangle K E C, when erected perpendicular to the plane of the dial on the line K C, will be parallel to the prime vertical, and perpendicular to the line I K, which, being the north and ſouth-line of the dial, is parallel to the planes of the horizon and of the meridian; and therefore, becauſe the angle E K C expreſſes the reclination of the plane of the dial from the plane of the meridian, the line E K will be perpendicular to the plane of the horizon, and parallel to the plane of the meridian.

Now the triangles K E C, K B C, having the ſide EC=BC, K C, common, and the angles E C K, B C K, both right, will be ſimilar and equal; therefore, when the plane of the ſtyle, repreſented by the triangle ACB, and the plane of the triangle KBC, are erected perpendicular to the plane of the dial, on the lines AC, KC, reſpectively, the triangle AKB, as the triangles KEC, KBC, then coincide, will be parallel to the plane of the meridian. Moreover, becauſe BK (= KE) = KM, AK, common, and the angles AKM, AKB, both right, the triangles AKM, AKB, will be equal and ſimilar; and therefore ABK = AMK = the complement of the given latitude; conſequently the angle KAB being equal to the given latitude, the upper-edge of the ſtyle AB, when produced, will paſs through the pole of the world, and ſo be parallel to the earth's axis.

If it be required to deſcribe a weſt reclining dial for a north-latitude, or an eaſt reclining one for a ſouth latitude, the method of conſtruction will ſtill be the ſame; provided that, inſtead of the line IK, you begin towards the left-end, and that the figures expreſſing the hours after noon be placed, inſtead of thoſe expreſſing the hours before noon.

A direct weſt reclining dial, for a north latitude, is conſtructed in the ſame manner as a direct eaſt reclining one, only that the points A and C change their poſition (A being placed, in this caſe, at the left-end of the line LC, and C at the right-end of the line IK); and that (the ſun not coming on the plane till after noon) the figures expreſſing the hours after noon be placed inſtead of thoſe before noon.

The ſame may be obſerved with regard to a direct eaſt reclining dial for a ſouth-latitude.

To deſcribe the hour-lines upon an erect ſouth-dial, for any propoſed north-latitude, to have alſo a given declination from the weſt; or an erect north-dial for a ſouth-latitude, to decline from the eaſt.

Draw the right line BC (*fig.* 9.) for the horizontal line of the dial, and perpendicular thereto draw BA; make the angle BCA equal to the propoſed latitude, and the angle CBD equal to the complement of the given declination; then, having taken BD equal to BC, draw DE perpendicular to BC; join A, E, and perpendicular thereto draw *f*E*g*, in which ſet off E*e* equal to the propoſed thickneſs of your ſtyle; through *e* draw *ea* perpendicular to *fg*, and let A*a* be parallel thereto: make EF equal to ED, and joining AF, draw EG perpendicular thereto; in AE and *ae*, produced, take EH and *eb*, each equal to EG, and from H to the point where *fg* interſects AB produced, draw H 12; then make the angles 12 H 11, 11 H 10, 10 H 9, each equal to 15°, and the angle *eb* 8, equal to the exceſs of 15°, above the angle EH 9: alſo make the angles 8 *b* 7, 7 *b* 6, 6 *b* 5, &c. each equal to 15°, and draw the right lines A 11, A 10, A 9, *a* 8, *a* 7, &c. for the hour-lines of 11, 10, 9, 8, &c. The upper-edge of the ſtyle will, when the dial is placed in its proper poſition, be parallel to the earth's axis: for BC being parallel to the plane of the horizon, the line AB perpendicular thereto, as the dial is an erect one, will be perpendicular to the ſaid plane; therefore the plane of the triangle BDE, when erected perpendicular to the plane of the dial, on the line BE, being perpendicular to the line AB, and parallel to the plane of the horizon, the line BD will be perpendicular to the plane of the prime vertical (becauſe the angle DBE expreſſes the complement of the plane's declination from that plane), and conſequently parallel to the plane of the meridian; therefore the plane of the prime vertical muſt coincide with the plane of the meridian. Again, ſince BD is equal to BC, (by conſtruction) the angles ABD and ABC, both right ones, and AB common, it is evident that the angle ADB is equal to the angle ACB, equal to the given latitude, and conſequently that the line DA will be parallel to the earth's axis.

But the triangle AEF, when the plane of the ſtyle, repreſented by the triangle AFE, is erected perpendicular to that of the dial, on the ſub-ſtyle AE, will coincide with the triangle ADE, becauſe DE is equal to FE, AE, common, and the angles AFE, AED, both right.

If it were required to draw an erect ſouth-dial, for a northern-latitude, to decline weſterly, or an erect north-dial, for a ſouthern latitude, to decline eaſterly; the method will ſtill be the ſame, only, inſtead of beginning the operation on the left ſide of AB, you muſt begin on the right ſide.

If the plane of an erect ſouth-dial, declining eaſterly, in a northern latitude, be inverted, the dial will then become an erect north-dial, declining weſterly, for the ſame latitude; and if the plane of an erect north-dial, declining weſterly, in a ſouthern latitude, be inverted, the dial will then become an erect ſouth-dial, declining eaſterly, for the ſame latitude.

An erect ſouth dial, declining weſterly, in a northern latitude, will become an erect north-dial declining eaſterly; and an erect north-dial, declining eaſterly, in a ſouthern latitude, will become an erect ſouth-dial, declining weſterly.

If the declination be very great, ſo that the elevation of the ſtyle above the ſub-ſtyle becomes very ſmall, the preceding method of drawing the hour-lines will be impracticable; becauſe thoſe which fall near the ſub-ſtyle, unleſs they be continued to a great diſtance from the center of the dial, nearly coincide: this inconvenience may be removed by the following method.

Having drawn the ſtyle AF, (*fig.* 10.) and the ſub-ſtyle AE as before, let the line EG be drawn perpendicular to AF; and, in AE continued, let EH be taken equal to EG; then, having drawn *f*E*g* perpendicular to AE, produce AB to meet *fg* in *g*, and join H, *g*. At a convenient diſtance let the line CD be drawn parallel to AE, for a new ſub-ſtyle, and the lines LM, PQ, at as great a diſtance from each other as room will permit, perpendicular thereto; alſo from the points I, N, where the lines LM, PQ, interſect CD, let IK, NR, be drawn perpendicular to AF. Make IS equal to IK, and NO equal to NR; alſo make the angles ISM, NOQ, each equal to the angle EH*g*; then, if the angles QO 11, MS 11, 11 O 10, 11 S 10, 10 O 9, 10 S 9, &c. be each made equal to 15°, lines drawn through the points M, 11, 10, 9, &c. Q, 11, 10, 9, &c. reſpectively, will be the hour-lines of the dial.

For, if from T, the point where FA and DC, continued, meet, a line be drawn through M to meet PQ in 12, the triangles TIK, TNR, and TIM, TN 12, will be reſpectively ſimilar; and therefore IM : N 12 :: IK : NR :: IS : NO: but IM : NQ :: IS : NO, by conſtruction; therefore N 12 = NQ, conſequently the line QM, continued, will paſs through T. In like manner it may be proved that the other hour-lines will paſs through T, the center of the dial; the ſtyle being here repreſented by the trapezium I*vw*N.

To draw the hour-lines upon an eaſt declining dial, for any propoſed northern latitude, to have a given reclination from the ſouth; or a weſt declining dial, for a ſouthern latitude, to have a given reclination from the north.

Having drawn the ſtyle AF, (*fig.* 11.) and ſub-ſtyle AE, anſwering to the given declination as before in the direct ſouth reclining dial, complete the parallelogram ABEK, and in BE, produced, take EH = EF = ED; alſo join KH, and make the angle EKL equal to the given reclination. On KL, produced, let fall the perpendicular HM, and taking EO equal to EL, draw OI parallel to EB, interſecting BD in Q.

On the propoſed plane, (*fig.* 12.) draw SXT, for the horizontal line, in which ſet off ST = BE, and TX = OQ; alſo, perpendicular to ST, draw SR, and TW, equal to KL, and LM, reſpectively: draw RW for the ſub-ſtyle, perpendicular to which draw *f*W*g*, and ſet off WY (= HM) for the altitude of the ſtyle, and W*w* for its thickneſs; alſo draw *wr* perpendicular, and R*r* parallel to *fg*. In RW and *rw* produced, take W*a* and *wb*, each equal to WZ, perpendicular to RY, and through X draw RX 12, meeting *fg* in 12; join *a*, 12, then make the angles 12 *a* 11, 11 *a* 10, each equal to 15°, and the angle *wb* 9, equal to the exceſs of 15°, above the angle W*a* 10: alſo make the angles 9 *b* 8, 8 *b* 7, &c. each equal to 15°, then right-lines drawn from R to 11, 10, 1, 2, and from *r* to 9, 8, 7, 6, will be the hour-lines of 11, 10, 1, 2, 9, &c.

It has been already proved, that when the plane ABEK (*fig.* 11.) is perpendicular to the plane of the horizon, the ſtyle FA is parallel to the earth's axis: in this caſe, (the planes KEH, AEF, and EBD, being all perpendicular to the plane A B E K) the lines E D, E H, and E F, coincide, and therefore expreſs the altitude of the point F, of the ſtyle, above the plane A B E K. Now, as the angle E K L expreſſes the given reclination or the inclination of the propoſed plane to the vertical plane, if the lines A H, A M, be drawn, H M will expreſs the altitude of the point F, above the plane A K M, and A H will coincide with A F, and ſo be parallel to the earth's axis. But as S R (*fig.* 12.) is by conſtruction equal to K L, if the parallelogram S V be compleated, V W will be = K M, the triangle R V W equal and ſimilar to the triangle A K M, and the triangle R W Y equal and ſimilar to the triangle A H M; conſequently, when the plane of the ſtyle, repreſented by the triangle R W Y, is erected perpendicular to the plane of the dial on the line R W, the upper-edge (R Y) thereof will paſs through the pole of the world, and ſo be parallel to the earth's axis.

If the dial be conſtructed for a northern latitude and E L be greater than E H, or, which is the ſame thing, K L greater than K M, the north-pole will be elevated, and the point W, in the ſub-ſtyle R W, will fall on the contrary ſide of R.

If it be required to deſcribe a reclining ſouth-dial, for a northern latitude, to decline weſt-ward, or a reclining north-dial, for a ſouthern latitude, to decline eaſt-ward; the method will ſtill be the ſame, only, inſtead of beginning the operation on the left-ſide of A B and R S, we muſt begin on the right ſide of them.

In deſcribing a reclining north-dial, for a north-latitude, to decline eaſterly; or a reclining ſouth-dial, for a ſouthern latitude, to decline weſterly, the conſtruction differs from the former; the points A, B, E, and K, now change their poſition, and fall in the places of E, K, A, and B, reſpectively; and that the line K L falls on the contrary ſide of K E, with reſpect to the line K H; alſo that the points R, S, T, and V, fall in the places of T, V, R, and S, reſpectively; and that the hour-lines of 1, 2, become thoſe of 11, 10, and thoſe of 11, 10, 9, &c. become the hour-lines of 1, 2, 3, &c.

If the plane of a reclining ſouth-dial, declining eaſterly, in a northern latitude, be inverted, the dial will then become an inclining north-dial, declining weſterly, for the ſame latitude; but the morning hour-lines in the reclining dial will become the afternoon hour-lines in the inclining one. In like manner a reclining north-dial, declining weſterly, in a ſouthern latitude, will become an inclining ſouth-dial, declining eaſterly, for the ſame latitude: alſo a reclining ſouth-dial, declining weſterly, in a northern latitude, will become an inclining north-dial, declining eaſterly, for the ſame latitude; and a reclining north-dial, declining eaſterly, in a ſouthern latitude, will become an inclining ſouth dial, declining weſterly, for the ſame latitude. Moreover, a reclining north-dial, declining eaſterly, in a northern latitude, will become an inclining ſouth-dial, declining weſterly, for the ſame latitude; and a reclining ſouth dial, declining weſterly, in a ſouthern latitude, will become an inclining north-dial, declining eaſterly, for the ſame latitude.

Having ſhewn the conſtruction of the various kinds of dials, whether erect, declining, reclining, or inclining, we ſhall here ſubjoin a general demonſtration of the method all along uſed, in drawing of the hour-lines; in order to this, Let A E (*fig.* 13.) be the ſub-ſtyle, A F the ſtyle, A 12 the meridian line, and A G any other hour-line at pleaſure; making (as is every where done) E H perpendicular to A F, and E*b* = E H; alſo let *b* G and G H be drawn.

Becauſe the ſun, in his apparent diurnal revolution, deſcribes an angle of 15° each hour about the axis of the earth, or the ſtyle A F of the dial, which is parallel to it, it is evident that if a plane, coinciding with (or lying upon) the line A F, be ſuppoſed to revolve about the ſame as an axis, at the rate of 15° per hour, it will, when produced, paſs through the ſun, and conſequently its interſection with the plane of the dial will mark out the true poſition of the hour-lines.

Now it is known that the angle included between any two planes is equal to (or meaſured by) the angle made by two lines in thoſe planes, perpendicular to their common interſection: alſo, by the general method we have conſtantly-uſed, the angle E*b*G is equal to the given hour-angle betwixt the time of the planes falling upon the ſub-ſtyle, and the propoſed hour-line A G: but the line H G is perpendicular to the axis A F, becauſe the plane G H E being perpendicular to the plane of the ſtyle E F A, all the lines in that plane (and conſequently H G) will be perpendicular to A F. And farther, the triangles E H G, E*b*G, having E H = E*b*, E G, common, and the angles H E G and *b* E G, both right, are equal in all reſpects; and conſequently the angle G H E, meaſuring the inclination of the plane betwixt the times of its falling on the ſub-ſtyle and the hour-line A G, will be equal to the angle G *b* E = the ſaid hour-angle by conſtruction.

DIALECT, *διαλεκτος*, an appellation given to the language of a province, in ſo far as it differs from that of the whole kingdom. The term, however, is more particularly uſed in ſpeaking of the ancient Greek, whereof there were four dialects, the Attic, Ionic, Æolic, and Doric, each of which was a perfect language in its kind, that took place in certain countries, and had peculiar beauties.

In Great Britain, beſides the grand diverſity of Engliſh and Scotch, almoſt every county has a dialect of its own, all differing conſiderably in pronunciation, accent, and tone, although one and the ſame language.

DIALECTICS, *Dialectica*, in the literary hiſtory of the ancients, that branch of logics which taught the rules and modes of reaſoning. See LOGIC.

DIALLING, the art of conſtructing all manner of dials. See DIAL.

DIALLING-GLOBE, an inſtrument of braſs or wood, with a plane fitted to the horizon, and an index, ſo contrived as to give a clear illuſtration of the principles on which dials are made.

DIALLING-LINES, or SCALES, are graduated lines placed on rulers, or the edges of quadrants and other inſtruments, to expedite the conſtruction of dials. Theſe are, 1. A ſcale of ſix hours, which is only a double tangent, or two lines of tangents, each of 45°, ſet together in the middle, and equal to the whole line of ſines, with the declination ſet againſt the meridian altitudes in the latitude of the place. 2. A line of latitudes, which is fitted to the hour-ſcale, and is made by this canon. As the radius : to the chord of 90° : : ſo are the tangents of each reſpective degree of the line of latitudes : to the tangents of other arches; and then the natural ſines of theſe arches are the numbers which, taken from a diagonal ſcale of equal parts, ſhall graduate the diviſions of the line of latitudes to any radius. The lines of hours and latitudes are, in general, for pricking down all dials with centers.

The other ſcales are particular, and give the ſeveral requiſites for all upright declining dials by inſpection. They are, 1. A line of chords. 2. A line for the ſub-ſtyle's diſtance from the meridian. 3. A line for the ſtyle's height. 4. A line of the angle of 12 and 6. 5. A line of inclination of meridians.

DIALLING-SPHERE, an inſtrument made of braſs, with ſeveral ſemi-circles ſliding over each other upon a moveable horizon; ſerving to demonſtrate the nature of ſpherical triangles, as well as to give the true idea of drawing dials on all ſorts of planes.

DIALLING, among miners, the ſame with plumming. See the article PLUMMING.

DIALOGISM, *διαλογισμος*, in rhetoric, is uſed for the ſoliloquy of perſons deliberating with themſelves, as the following of Juno, in the firſt Æneid of Virgil:

> *—— mene incepto deſiſtere victam?*
> *Nec poſſe Italia Teucrorum avertere regem?*
> *Quippe vetor fatis? &c.*

In this ſenſe it is diſtinguiſhed from dialogue.

DIALOGUE, in matters of literature, a converſation between two or more perſons, either by writing or by word of mouth.

The word is formed from the Greek, *δια*, together, and *λογος*, a diſcourſe.

DIALYSIS, in grammar, a mark or character, conſiſting of two points, ¨, placed over two vowels of a word, in order to ſeparate them, becauſe otherwiſe they would make a diphthong, as Moſaïc, &c. See the article Diæresis.

DIAMETER, in geometry, a right line paſſing through the center of a circle, and terminated at each ſide by the circumference thereof. See the article Circle.

The chief properties of the diameter are, that it divides the circumference of a circle into two equal parts: hence we have a method of deſcribing a ſemi-circle upon any line, aſſuming its middle point for the center. The diameter is the greateſt of all chords.

For finding the ratio of the diameter to the circumference; ſee Circle.

Diameter *of a Curve*, is a right-line, as AC, (plate LIV. *fig.* 1.) that biſects the right lines DE, DE, drawn parallel to one another; and are either of a finite or infinite length.

Although a right-line, biſecting all parallel lines drawn from one point of a curve to another, is taken in a ſtrict ſenſe only for the diameter of a curve-line; yet it may not be amiſs more generally to define a diameter, in ſaying, that it is that line, whether right or curve, which biſects all parallels drawn from one point of a curve to another; ſo that, according to this, every curve will have a diameter: and thence Sir Iſaac Newton's curves of the ſecond order have all either a right-lined diameter, or elſe the curves of ſome one of the conic ſections for diameters: and many geometrical curves of the higher orders may alſo have for diameter curves of more inferior ones, and that *ad infinitum*.

Diameter *of a Sphere*, is the diameter of the ſemicircle, by whoſe rotation the ſphere is generated; in which ſenſe it is the ſame with axis. See the article Axis.

Diameter *of the heavenly Bodies*, in aſtronomy. See Planet.

Diameter *of a Column*, in architecture, is its thickneſs juſt above the baſe. See Column.

From this the module is taken, which meaſures all the other parts of a column. See the article Module.

DIAMOND, *Adamas*, in natural hiſtory, a ſtone which, though naturally colourleſs like the pureſt water, is eminently diſtinguiſhed from all others of the colourleſs kind by the luſtre of its reflections.

It is found ſometimes in an angular, and ſometimes in a pebble-like form. In its angular ſtate however it does not, like the reſt, reſemble the common ſpring cryſtal, but the more perfect bodies of that claſs, the double-pointed ones.

The true figure of the diamond in its angular, that is, its moſt perfect form, is an inequilateral octahedron, compoſed of two quadrilateral pyramids affixed baſe to baſe, and conſequently their points turned the oppoſite way; theſe the jewellers call ſix-pointed ſtones: but beſides this, there are two other leſs perfect angular figures, a columnar one of ſix ſides, and an oblong quadrilateral column with two truncated ends; beſides, there is an almoſt infinite variety of others, cornered and pointed, but which properly belong to it in its pebble form. In this ſtate it is ſometimes roundiſh, ſometimes oblong, and ſometimes flat, and in ſome ſpecimens perfectly ſmooth, in others full of inequalities on the ſurface.

In whichſoever of theſe forms the diamond is found, it is the ſame ſtone, and when poliſhed has the ſame qualities in proportion to its perfection and purity.

The diamond, like all other tranſparent foſſils, is liable to be tinged by metalline particles, and is ſometimes found with a caſt of red, ſometimes blue, ſometimes green, and more frequently yellow. The ſmall diamonds are vaſtly the more plentiful, the others are found more and more rarely as they increaſe in ſize. The largeſt ever certainly known is now in the poſſeſſion of the Great Mogul; its weight is 279 carats, and its value is computed at between ſeven and eight hundred thouſand pounds.

As diamonds have originally, without all queſtion, been concreted out of a fluid, it is not at all ſurpriſing, that among the various accidents ſuch a concretion muſt have been attended with in the bowels of the earth; ſome parts of the matter ſhould have ſhot into quadrangular pyramids, while other parts of it form themſelves into hexangular, pyramidal, or pebble-like concretions.

The diamond in its native ſtate is ſometimes bright as if poliſhed by art, but more frequently its ſurface is obſerved with foulneſſes of various kinds; and ſometimes it is, as the diamond-cutters call it, veiny, that is, it has certain points inconceivably hard on its ſurface.

The diamond bears the force of the ſtrongeſt fire unhurt, if ever ſo long continued in it, provided it be not removed too ſuddenly into the cool air, when it will ſometimes crack. Expoſed to the ſolar rays collected in the focus of a large lens, it after ſome time ſplits into ſeveral very thin flakes, like thoſe of talc, and theſe ſoon after run into a kind of glaſs, which has nothing of the hardneſs or luſtre of the diamond.

The places whence we have the diamonds are the Eaſt-Indies, in the Iſland of Borneo, and in the kingdom of Viſapour, Golconda, Bengal; and the Braſils in the Weſt-Indies.

The diamond, as has been obſerved, is the hardeſt of all precious ſtones; it can only be cut and ground by itſelf, and its own ſubſtance.

To bring it to that perfection which augments its price ſo conſiderably, they begin by rubbing two ſtones againſt each other, while rough, after having well cemented them to the ends of two ſticks, or blocks, called cutting ſticks, thick enough to be held in the hand. It is this powder thus rubbed off the ſtones, and received in a little box for that purpoſe, called the cutting-box, which ſerves to grind and poliſh the ſtones.

Diamonds are cut and poliſhed by means of a mill, which turns a wheel of caſt iron, ſprinkled over with diamond duſt, mixed with oil of olives.

The ſame duſt, well ground and diluted with water and vinegar, is uſed in the ſawing of diamonds, which is performed with an iron or braſs wire as fine as a hair.

Sometimes, inſtead of ſawing the diamonds, they cleave them, eſpecially if there be any ſmall ſhivers in them; but the Europeans rarely run the riſque of cleaving, for fear of breaking them.

A rough diamond ought to be choſen uniform, of a good ſhape, tranſparent, not quite white, and free from flaws and ſhivers.

Shivers are cauſed in diamonds by this, that the miners, to get them more eaſily out of the vein, which winds between two rocks, break the rocks with huge iron levers, which ſhakes and fills the ſtone with ſhivers.

The ancients had two miſtaken notions as to the diamond; the firſt is, that it becomes ſoft, by ſteeping it in hot goat's blood; and the ſecond, that it is malleable, and bears the hammer; but however, experience has ſhewn the contrary, there being nothing capable of mollifying the hardneſs of the ſtone; and its hardneſs is ſuch, that it will endure being ſtruck at pleaſure with the hammer.

The fineſt diamonds now in the world are that of the Great Mogul, weighing 279 carats, as has been already obſerved; that of the great duke of Tuſcany, weighing 139 carats; and that known in France by the name of grand fancy, which is one of the crown jewels, weighing 106 carats; whence comes its name fancy, which is a corruption of cent. ſix; that is, 106.

The whole proceſs of cutting and poliſhing diamonds will be better underſtood from the annexed delineations, than from any deſcription, however particular and accurate.

Explanation of plate LIII.

The upper-compartment of the plate repreſents the work-ſhop of a diamond-cutter, with the mill and men at work.

Fig. 1. is a workman cutting the diamonds by rubbing two of theſe ſtones, firmly cemented to ſticks, againſt each other, while the duſt that falls from the ſtones during the operation, is carefully received into an utenſil, called a cutting-box.

Fig. 2. is a workman ſtanding at the front of the mill, and touching the iron wheel, which they call a ſkeve, with diamond-duſt, mixed up with olive-oil, by means of a gooſe-quill cut almoſt in the ſhape of a writing pen. The workmen call it a ſtriking-pen.

Fig. 3. is a labourer turning the mill, which is done by

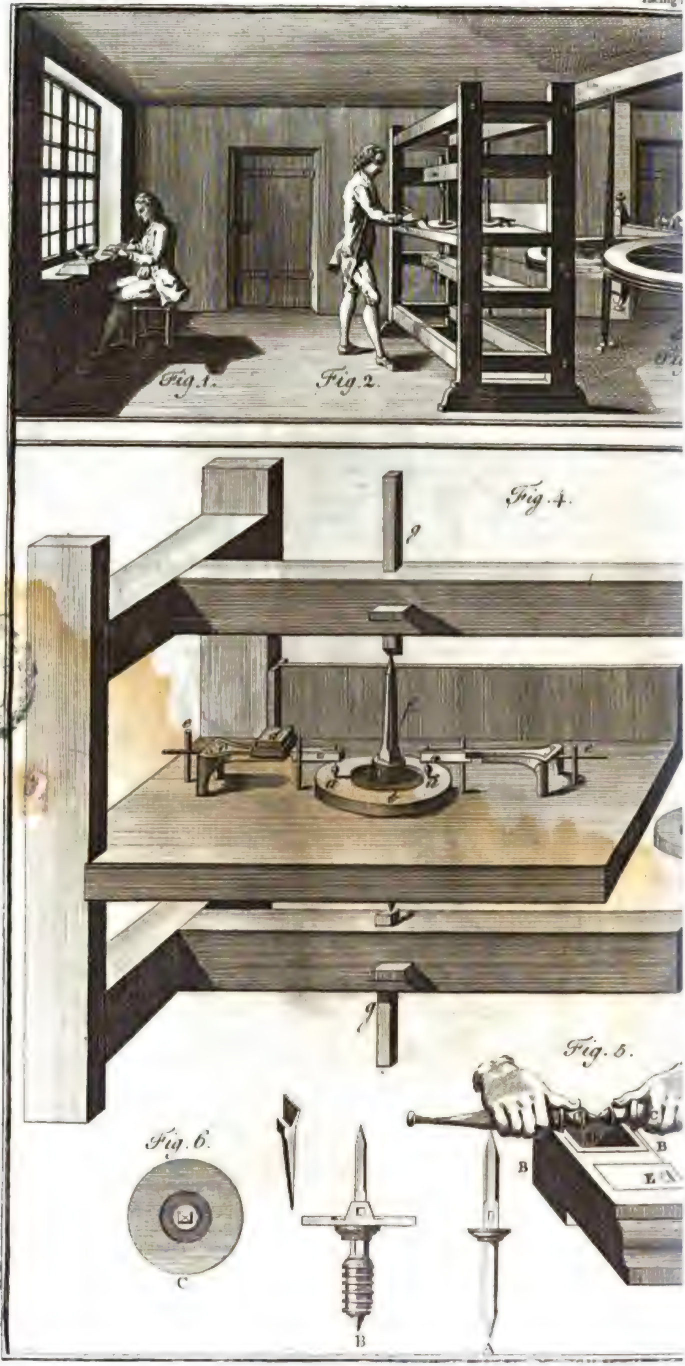


Fig. 1.
Fig. 2.
Fig. 4.
g
f
e
d
d
d
e
g
Fig. 5.
B
B
E
Fig. 6.
C
B
A

by moving backwards and forwards an inſtrument of wood, which they call a gate. This alternate motion turns the large wheels, by means of an iron-arm, which they call a ſword; one end of which is faſtened to the gate, and the other to a crank or elbow in the ſpindle of the wheel. The large wheels being thus put in motion by means of the gate, the diamond-mill is turned by chords or ſtrings going round the circumference of theſe wheels, and the fuſees on the ſpindles of the mill.

Lower Compartment.

Fig. 4. repreſents the principal part of the diamond-mill on a large ſcale; where *a*, *a*, are diamonds, ſoldered into a hollow piece of metal: the workmen call them drops. *b*, the ſkeve, or wheel, on which the diamonds are poliſhed, by means of their own duſt mixed with oil. *c*, *c*, are tools, which they call tongs, through a hole in the top of which the ſtem or ſhank of the drop paſſes. *d*, *d*, are pieces or weights of lead placed upon the tongs, in order to preſs the diamond more forcibly on the ſkeve. They uſe a greater or leſſer number of theſe weights, according as the diamonds are larger or ſmaller. *e*, *e*, *e*, *e*, are four perpendicular pins, which they call pegs, and ſerve to hold the tongs, as repreſented in the figure. *f*, is the ſpindle or axis of the wheel *b*. *g*, *g*, plugs for faſtening the ſpindle. *h*, *h*, lead weights.

Fig. 5. The cutting-box on a large ſcale. B, B, B, the cutting-box. C, C, cutting-ſticks, with diamonds cemented to their extremities. This figure repreſents the manner in which the ſticks are held by the workman in cutting the diamonds. D, the inſide or cavity of the cutting-box. E, a ſlide covering another cavity in which they keep their rough diamonds.

Fig. 6. The ſkeve and its ſpindle repreſented in different views. A, elevation of the ſpindle. B, another elevation with its fuſee, and the ſkeve cut through its diameter. C, plan of the ſkeve. D, the ſkeve and its ſpindle in perſpective.

Valuation of DIAMONDS, among jewellers, is thus calculated: they ſuppoſe the value of a rough diamond to be 2 *l.* per carat; then to find the value of thoſe of greater weight, they multiply the ſquare of their weight by 2, and this laſt product is the value of the diamonds in their rough ſtate: thus, the value of a rough diamond, weighing 4 carats, is equal $4\times4\times2=16\times2=32$ *l.* and ſo in other caſes.

Again, to find the value of wrought diamonds, they ſuppoſe half their weight loſt in the manufacturing them, and therefore multiply the ſquare of double their weight by 2: thus the value of a wrought diamond, weighing 3 carats, is equal $6\times6\times2=36\times2=72$ *l.*

Corniſh DIAMOND, in natural hiſtory, a name given to a kind of cryſtals, from their being found in Cornwall.

Rough DIAMOND is the ſtone as nature produces it in the mines.

Roſe DIAMOND is that quite flat underneath, with its upper-part cut in divers little faces, uſually triangles, the uppermoſt of which terminate in a point.

Table DIAMOND is that which has a large ſquare face at top, encompaſſed with four leſſer.

Brilliant DIAMOND is that cut in faces, both at top and bottom; and whoſe table, or principal face at top, is flat.

DIAMOND, in the glaſs trade, an inſtrument uſed for ſquaring the large plates or pieces; and among glaziers, for cutting their glaſs.

Theſe ſort of diamonds are differently fitted up; thoſe uſed for cutting looking-glaſs, &c. are called plough-diamonds fitted into a kind of plane; and thoſe made uſe of by glaziers are ſet in an iron ferril, about two inches long, and a quarter of an inch or ſomewhat more, in diameter; and in which is a handle of box, ebony, &c. fitted to the ferril, for holding it by.

DIAMOND, in heraldry, a term uſed for expreſſing the black colour in the atchievements of peerage.

Guillim does not approve of blazoning the coats of peers by precious ſtones inſtead of metals and colours; but the Engliſh practice allows it. Morgan ſays the diamond is the emblem of fortitude.

DIAMORUM, in pharmacy, a preparation of mulberries and honey, uſed againſt diſeaſes of the throat, and for ſtopping dyſenteries, &c.

DIANÆ ARBOR, or ARBOR LUNÆ, in chemiſtry, the beautiful cryſtallizations of ſilver, diſſolved in aqua-fortis, to which ſome quickſilver is added; and ſo called from their reſembling the trunk, branches, leaves, &c. of a tree.

DIANDRIA, in the Linnæan ſyſtem of botany, a claſs of plants comprehending all thoſe with hermaphrodite flowers, and only two ſtamina in each; ſuch are ſage, olive, phillerea, jeſſamine, roſemary, &c.

DIANTHUS, in botany, a genus of plants, whoſe corolla conſiſts of five petals, the ungues of which are of the length of the cup; they are narrow, and inſerted into the receptacle; the limb is plane; and the bracteæ of the petals broadeſt at the extremity, and crenated; the fruit is a cylindric covered capſule, conſiſting of one cell, and opening four ways at the top; the ſeeds are numerous, compreſſed, and roundiſh.

This genus comprehends the clove-july-flowers or carnations, the pinks, and ſweet-williams; all beautiful flowers, which may be propagated by ſeeds or layers.

DIAPASMA, in pharmacy, a name for all powders ſprinkled on the body, whether as perfumes or otherwiſe. See the article CATAPASMA.

DIAPASON, in muſic, a muſical interval, by which moſt authors, who have wrote upon the theory of muſic, uſe to expreſs the octave of the Greeks. See OCTAVE.

DIAPASON, among the muſical inſtrument-makers, a kind of rule or ſcale, whereby they adjuſt the pipes of their organs, and cut the holes in their flutes, hautboys, &c. in due proportion, for performing the tones, ſemitones, and concords juſt.

A ſquare being divided into eight parallelograms, the points wherein a diagonal line interſects all theſe parallelograms, expreſs all the uſual intervals in muſic: and on this principle it is that the diapaſon is founded. There is a particular kind of diapaſon for trumpets, ſerving as a ſtandard of the different magnitudes they muſt have to perform the four parts of muſic. See the article TRUMPET.

There is another for ſackbuts, ſhewing how far they are to be lengthened and ſhortened, to raiſe or fall from one tone to another.

The bell-founders have likewiſe a diapaſon, ſerving to regulate the ſize, thickneſs, weight, &c. of their bells.

DIAPASON DIAEX, in muſic, a kind of compound concord, whereof there are two ſorts; the greater, which is in the proportion of 10 : 3; and the leſſer, in that of 16 : 5.

DIAPASON DIAPENTE, in muſic, a compound conſonance in a triple ratio, as 3 : 9. This interval, ſays Martianus Capella, conſiſts of nine tones and a ſemitone, nineteen ſemi-tones, and thirty-eight dieſes. It is a ſymphony made when the voice proceeds from the firſt to the twelfth ſound.

DIAPASON DIATESSARON, in muſic, a compound concord, founded on the proportion of 8 : 3. To this interval Martianus Capella allows eight tones and a ſemi-tone, ſeventeen ſemi-tones, and thirty-four dieſes.

This is when the voice proceeds from its firſt to its eleventh ſound. The moderns would rather call it the eleventh.

DIAPASON DITONE, in muſic, a compound concord, whoſe terms are as 10 : 4, or 5 : 2.

DIAPASON SEMIDITONE, in muſic, a compound concord, whoſe terms are in the proportion of 12 : 5.

DIAPEDESIS, in medicine, a tranſudation of the fluids through the ſides of the veſſels that contain them, occaſioned by the blood's becoming too much attenuated, or the pores becoming too patent.

DIAPENTE, in the ancient muſic, an interval marking the ſecond of the concords; and, with the diateſſaron, an octave.

This is what, in the modern muſic, is called a fifth.

DIAPENTE COL DITANO, in muſic, is, by Zarlin, and many others, uſed for what we call the ſeventh major. See the article SEVENTH.

DIAPENTE COL SEMIDITANO, in muſic, is the ſeventh minor. See the articles MINOR and MAJOR.

Diapente, in pharmacy, is uſed for a medicine compounded of five ſeveral drugs or ingredients.

DIAPERED, or **Diapre**, in heraldry, the dividing of a field in planes, like fret-work, and filling the ſame with variety of figures. This chiefly obtains on bordures, which are diapered or fretted over, and the frets charged with things proper for bordures. Baron renders it *variatus*, which is not ſufficient to expreſs the ſeveral things of which it is variated.

DIAPHANOUS, an appellation given to all tranſparent bodies, or ſuch as tranſmit the rays of light; a quality which, according to the Carteſians, is owing to the rectitude or ſtraightneſs of their pores; but, according to Sir Iſaac Newton, to the homogeneity of the ſubſtance of theſe bodies, and of the medium which occupies their pores.

DIAPHOENICUM, in pharmacy, a ſort of medicine or electuary, chiefly made of dates. It purges ſeroſities, and excites the menſes. It is alſo uſed in dropſies, lethargies, apoplexies, and palſies.

DIAPHORESIS, *διαφορησις*, in medicine, an elimination of the humours in any part of the body through the pores of the ſkin. See the article Perspiration.

DIAPHORETICS, among phyſicians, all medicines which promote perſpiration. See the article Alexipharmic.

DIAPHRAGM, in anatomy, the part which ſeparates the thorax from the abdomen; vulgarly called the midriff.

The word is derived from the Greek, *διαφραττω*, to incloſe or wall in.

It is alſo called ſeptum tranſverſum, or croſs-wall, from its ſituation, becauſe it divides the trunk of the body into two cavities, the thorax and abdomen. It is compoſed of two muſcles; the firſt and ſuperior of theſe ariſes from the ſternum, and the ends of the laſt ribs, in each ſide. Its fibres, from this ſemi-circular origination, tend towards their center, and terminate in a tendon, or aponeuroſis, which hath always been taken for the nervous part of the midriff. The ſecond and inferior muſcle comes from the vertebræ of the loins by two productions, of which that on the right-ſide comes from the firſt, ſecond, and third vertebræ of the loins; that on the left-ſide is ſomewhat ſhorter; and both theſe productions join and make the lower part of the midriff, which joins its tendon with the tendon of the other, ſo as that they make but one membrane, or rather partition. It is covered with a membrane on its upper-ſide, and by the peritonæum on the lower-ſide. It is pierced in the middle for the paſſage of the vena cava, in its lower-part for the œſophagus, and the nerves which go to the upper orifice of the ſtomach; and betwixt the productions of the inferior muſcle, paſſes the aorta, the thoracic duct, and the vena azygos. It receives arteries and veins called phrenicæ, from the cava and aorta; and ſometimes on its lower-part two branches from the vena adipoſa, and two arteries from the lumbares. It has two nerves which come from the third vertebræ of the neck, which paſs through the cavity of the thorax, and are diſperſed in the muſcles of the midriff. In its natural ſituation, it is convex on the upper-ſide towards the breaſt, and concave on its lower ſide towards the belly: therefore, when its fibres ſwell and contract, it muſt become plane on each ſide, and conſequently the cavity of the breaſt is enlarged to give liberty to the lungs to receive the air in inſpiration; and the ſtomach and inteſtines are preſſed for the diſtribution of the chyle: but it diminiſhes the cavity of the breaſt when it reſumes its natural ſituation, and preſſes the lungs for the expulſion of the air in exſpiration.

DIAPHORESIS, in rhetoric, a figure of oratory, expreſſing the uncertainty of the ſpeaker how he ſhall proceed in his diſcourſe.

DIARBEC, or **Diarbeck**, a province in Aſia, anſwering to the ancient Meſopotamia: it is ſituated on the river Tigris, near its ſource, in the 42^d^ deg. eaſt long. and in the 37th deg. 30 min. north lat. It is alſo the capital of the ſame province.

DIARRHODON, in pharmacy, a name given to divers compoſitions in which roſes are the principal ingredient.

DIARRHOEA, in medicine, a looſeneſs, or a frequent and plentiful diſcharge of thin, watery, mucous, ſlimy, frothy, bilious, or blackiſh matter from the inteſtines, ſometimes with, and ſometimes without a mixture of the inteſtines.

The word is formed from the Greek, *δια*, through, and *ῥεω*, to flow.

All ſorts of ſubſtances whatever, poſſeſſed of any degree of acrimony, will ſtimulate the inteſtines, accelerate their periſtaltic motion, invite a larger quantity of fluids to their glands, and cauſe a diſcharge of their contents by ſtool.

If alcaleſcent aliments be taken into the ſtomach in quantities ſuperior to the powers of digeſtion, they putrify, and, becoming acrimonious, by their ſtimulus provoke a diarrhœa. Thus, thoſe who eat ſtale fiſh fall frequently into a violent diarrhœa; and half a grain of putrified yolk of an egg will produce a great number of ſtools.

If aceſcent aliment be taken in too large quantities, they putrify and contract an acid acrimony. Thus milk, if it turn acid on the ſtomach, purges; as do fruits and other vegetables under the ſame circumſtances. If the ſtomach, inteſtines, liver, pancreas, or any part which has an immediate communication with the inteſtinal tube, be affected with an abſceſs of any kind, the acrimonious matter diſcharged ſtimulates the inteſtines, and produces a diarrhœa.

In caſe of an abſceſs in any part remote from the inteſtinal tube, as in the lungs, and ſo ſituated that it cannot be diſcharged externally, the patent orifices of the veins may abſorb a part, or even all the pus, and convey it to the arteries of the inteſtines, which may depoſit this acrimonious matter upon them, where it may ſtimulate them to a diarrhœa; or, if this ſhould not happen, the matter may be conveyed by the arteries to the veins which form the vena portæ, which does in ſome meaſure the office of an artery with reſpect to the liver: and here the matter may be ſeparated from the maſs of blood, diſcharged by the biliary ducts into the inteſtines, and thus paſs off in copious ſtools.

If an evacuation, as perſpiration, ſhould be obſtructed, the matter retained will acquire a tendency to acrimony, and be more likely to be depoſited upon the inteſtines than any where elſe.

When the obſtructing matter, in a chronical diſorder, is reſolved, moved, and mixed with the maſs of blood, this may and is frequently conveyed to the inteſtines, and diſcharged by a diarrhœa. Thus perſons who eat large quantities of the ſaponaceous ſpring herbs, or ripe fruits, fall into a plentiful diarrhœa, attended with ſalutary effects.

Hence we may perceive how careful phyſicians ſhould be to inveſtigate the cauſes of diarrhœas, in order to preſcribe judiciouſly, and to avoid doing a great deal of prejudice: for the matter muſt be carried off, either ſpontaneouſly, or by art, before any aſtringents can be adminiſtered; which ſeem only to be indicated when the diſcharge is ſo exorbitant as to endanger life; or when the emiſſaries of the glands that open into the inteſtines, are too much relaxed, after the ſtimulating cauſe is perfectly eliminated.

Deſtroying the peculiar acrimony that cauſes a diarrhœa, when that can be done, will bid fair to cure, or at leaſt to alleviate the diſorder.

DIARTHROSIS, in anatomy, a kind of articulation, or juncture of the bones, in which there is a manifeſt motion. See the article Articulation.

The diarthroſis comprehends, 1. The enarthroſis, in which the head of one of the bones is received into a deep cavity in the other, as in the articulation of the femur. 2. The arthrodia, in which the head of one of the bones is received into a ſlighter cavity in the other, as in the juncture of the os humeri with the ſcapula. 3. The ginglymus, in which the bones mutually receive, and are received by one another, as in the caſe in the articulation of the humerus and cubitus.

To theſe, Fallopius adds the trochoides, in which the motion is like that of a wheel about its axis, as is the caſe of the articulation of the firſt vertebræ of the neck with the ſecond: and to all theſe ſome of the modern anatomiſts have added alſo the amphiorthroſis, a term which comprehends all thoſe junctures of the bones which have a manifeſt motion, and which differ from the ſeveral articulations now deſcribed, either in regard of their figure, or the motion they allow of. See the articles Enarthrosis, Arthrodia, Ginglymus, &c.

DIARY, among traders, denotes a day-book containing the proceedings of one day. See the article Book-Keeping.

Diary Fever, the ſame with an ephemera. See the article Ephemera.

DIASCHISM, διασχισμα, among muſicians, denotes the difference between the comma and enharmonic dieſis, commonly called the leſſer comma.

DIASCORDIUM, in pharmacy, a celebrated compoſition, ſo called from ſcordium, one of its ingredients.

DIASEBESTEN, in pharmacy, a ſoft purgative electuary, of which ſebeſtens are the principal ingredients.

DIASENNA, in pharmacy, the name of a medicine in which ſenna is the principal ingredient.

DIASIA, in Grecian antiquity, a feſtival kept at Athens in honour of Jupiter the Propitious.

DIASTASIS, a term uſed by ancient phyſicians for a diſtention of the muſcles, or ſeparation of the bones.

DIASTEM, διαςημα, among ancient muſicians, the ſame with what the moderns call interval. See Interval.

DIASTOLE, διαςολη, among phyſicians, ſignifies the dilatation of the heart, auricles, and arteries; and ſtands oppoſed to the ſyſtole, or contraction of the ſame parts. See Systole and Heart.

Diastole, in grammar, a figure of proſody, whereby a ſyllable naturally ſhort is made long: ſuch is the firſt ſyllable of Priamides, in the following verſe of Virgil:

> *Atque hic Priamides: nihil ô tibi, amice, relictum.*

This figure is uſed either out of mere poetic licence, without any neceſſity for ſo doing, or through neceſſity for the ſake of the verſe; as when three or more ſhort ſyllables follow each other in hexameter verſe.

DIASTYLE, in the ancient architecture, an edifice, where the columns ſtand at ſuch a diſtance one from another, that eight modules, or four diameters, are allowed for the intercolumniation.

DIASYRMUS, διασυρμος, in rhetoric, a kind of hyperbole, being an exaggeration of ſome low, ridiculous thing.

DIATESSARON, διατεσσαρων, among ancient muſicians, a concord, or harmonious interval, compoſed of a greater tone, a leſs tone, and one greater ſemi-tone: its proportion in numbers is 4 : 3. See the article Concord.

Diatessaron, in pharmacy, the name of a compoſition ſo called from the four ingredients it comprehends.

DIATONIC, an epithet given to muſic, as it proceeds by tones and ſemi-tones, both aſcending and deſcending. See the articles Music and Genus.

The Greek authors divide the genera or kinds of muſic into diatonic, chromatic, and enharmonic. See Chromatic and Enharmonic.

Diatonic muſic, according to Nicomachus and others, allows of three degrees, the greater tone, leſſer tone, and ſemi-tone. See the article Tone.

Hence diatonic muſic appears the moſt natural, and of conſequence the moſt ancient. In the diatonic muſic, there is a tone between every two notes in the ſcale, except *mi* and *fa*, or, as the French term it, *ſi* and *ut*, where there is only a greater ſemi-tone. The diatonic genus was by the ancients divided into two ſpecies, the *molle*, and the *intenſum*. This laſt is in daily practice. It is commonly ſaid to conſiſt of two tones and a ſemi-tone; but to ſpeak exactly, it conſiſts of a ſemi-tone major, a tone minor, and a tone major.

DIATONICO-DIATONICO, according to Zarlin, is the pure and natural diatonic genus, or when the progreſs of the notes is B quarré or B natural, in which not one of the ſounds is the leaſt altered. Such is the plain chant of the church.

DIATRAGACANTH, in pharmacy, a name applied to certain powders, of which gum tragacanth is the principal ingredient.

DIAZEUCTIC, or Diezeuctic Tone, in the ancient Greek muſic, a tone which disjoined two fourths, one of each ſide of it; and which, being joined to either, made a fifth: this, in their muſic, was from *meſe* to *parmeſe*; that is, from our A to B: ſuppoſing *mi* to ſtand in B *ſub mi*, they allowed to their diazeuctic tone, which is our *la mi*, the proportion of 9 : 8, as being the unalterable difference of the diapente and the diateſſaron. See the article Diapente, &c.

DIBBLE, among gardeners, the name of the tool, or forked ſtick, wherewith they ſet plants.

DICHOTOMY, a term uſed by aſtronomers for that phaſis, or appearance of the moon, wherein ſhe is biſected, or ſhews juſt half her diſc. In this ſituation the moon is ſaid to be in a quadrate aſpect, or to be in her quadrature.

Dichotomy, in botany, a term uſed to expreſs that diviſion of the branches which we ſee in the miſletoe, and in the greater part of the ſea fucus's, in which each branch is divided into two.

DICKER, *Dicra*, in old writers, denotes the quantity of ten hides of ſkins, of which twenty made a laſt: alſo ten pair of gloves, ten bars of iron, and the like, are ſometimes expreſſed by the term dicker.

DICTAMNUS, dittany, in botany, a genus of plants, with oval acuminated leaves, like thoſe of the aſh-tree, but ſmaller and more juicy, ſet in pairs on a middle rib, which is terminated by an odd one: on the tops of the ſtalks ſtand elegant long ſpikes of irregular white or purpliſh flowers, followed each by five pods full of ſhining black ſeeds. It is perennial, and grows wild in the mountainous parts of France, Italy, and Germany; from whence the white cortical part of the root is ſometimes brought to us, dried, and in the form of quills.

The herb has a ſtrong ſmell, of an unpleaſant reſinous or bituminous kind: on the tops of the ſtalks, and the flower cups, the microſcope diſcovers innumerable little veſicles, filled with an eſſential oil, the ſource of its ſtrong ſcent. It is ſaid, that on the approach of a candle, in very hot dry weather, its effluvia take fire.

The root, when freſh, has a moderately ſtrong, not diſagreeable ſmell; as met with in the ſhops, it has ſcarcely any. This root ſtands recommended as a ſtomachic, anthelmintic, alexipharmic, and as an aperient in uterine obſtructions; but is at preſent very rarely made uſe of.

DICTATE, *Dictamen*, among ſchoolmen, a motion, or ſuggeſtion of a man's conſcience, contrary to which if any action is performed, it is properly termed a bad one, even if the conſequences ſhould prove otherwiſe. See the article Conscience.

Dictate, *Dictata*, is alſo uſed in the ſchools for the lecture of a maſter, which the ſcholars take down in writing; whence this act of the maſter is termed dictating.

DICTATOR, in the policy of the ancient Romans, a magiſtrate inveſted with ſovereign and even arbitrary power.

DICTION, the phraſe, elocution, or ſtyle of a writer, or ſpeaker.

DICTIONARY, a collection of all the words of a language, art, ſcience, &c. with their explanations, ranged in alphabetical order.

The word is formed from the Latin, *dictionarium*, which is derived from *dictio*, a word.

DICTUM, in our old writers, implies an arbitrament or award; and hence the term dictores is uſed for arbitrators.

Dictum De Kenelworth, was an award between king Henry III. and his barons and others who had been in arms againſt him, wherein was contained a compoſition of thoſe that had forfeited their eſtates in the rebellion. It was ſo called on account of its being made at Kenelworth caſtle in Warwickſhire.

DIDACTIC, or Didactical, in the ſchools, ſignifies the manner of ſpeaking, or writing, adapted to teach or explain the nature of things.

DIDYNAMIA, διδυναμια, in the Linnæan ſyſtem of botany, a very comprehenſive claſs of plants, the fourteenth in order; the eſſential characteriſtic of which is, that there are four ſubulated ſtamina, inſerted into the tube of the flower, two of which are ſhorter than the others, and placed together; the antheræ being commonly hid under the upper lip of the flower, and connivent in pairs. It has its name from the too longer ſtamina being ſuppoſed more efficacious in fecundating the ſeeds, than the reſt; and as the genera belonging to it are very numerous, they have been divided into two ſeries or orders, under the names of gymnoſpermia and angioſpermia; the latter having, and the former wanting a pericarpium; or ſeed veſſel. See BOTANY.

To this genus belong baum, germander, lavender, thyme, betony, mint, fox-glove, bear's-breech, &c.

DIE, in architecture, the ſame with dye. See the article DYE.

DIES, or DAY. See the article DAY.

DIESIS, in muſic, is the diviſion of a tone leſs than a ſemi-tone; or, an interval conſiſting of a leſs or imperfect ſemi-tome.

Dieſis is the ſmalleſt and ſofteſt change or inflexion of the voice imaginable: it is called a feint, expreſſed thus X, by a St Andrew's croſs, or ſaltier. Ariſtotle calls dieſes the elements of the voice, as letters are thoſe of diſcourſe. It appears, however, that Ariſtotle's dieſes were different from ours; and we find Vitruvius, and all the Greek authors, expreſsly make the dieſis a quarter of a tone: but the Pythagoreans, who are held inventors of the name dieſis, did not make it ſo ſmall: they only divided the tone into two unequal parts; and they called the leſſer dieſis, which we call a leſſer ſemi-tone; and the greater, which we call the greater ſemi-tone, they called apotome. See APOTOME.

But in latter times, when the tone came to be divided into three or four parts, the name dieſis was retained to them all.

DIET, *Diæta*, in phyſic, a way and method of living, comprehending not only what is generally underſtood by this word, but alſo whatever elſe concerns the management of human life.

The natural conſtitution of the body of man is ſuch, that it can eaſily bear ſome changes and irregularities, without much injury: had it been otherwiſe, we ſhould be almoſt conſtantly put out of order by every ſlight cauſe. This advantage ariſes from thoſe wonderful communications of the inward parts, whereby, when one part is affected, another comes immediately to its relief. Thus, when the body is too full, nature cauſes evacuations through ſome of the outlets: and for this reaſon it is, that diſeaſes from inanition are generally more dangerous than from repletion; becauſe we can more expeditiouſly diminiſh than increaſe the juices of the body. Upon the ſame account alſo, though temperance be beneficial to all men, the ancient phyſicians adviſed perſons in good health, and their own maſters, to indulge a little now and then, by eating and drinking more plentifully than uſual. But, of the two, intemperance in drinking is ſafer than in eating: and if a perſon has committed exceſs in the latter, cold water drank upon a full ſtomach will help digeſtion; to which it will be of ſervice to add lemon juice, or elixir of vitriol. If he has eaten high ſeaſoned things, rich ſauces, &c. then let him ſit up for ſome little time, and afterwards ſleep. But if a man happen to be obliged to faſt, he ought to avoid all laborious work. From ſatiety it is not proper to paſs directly to ſharp hunger, nor from hunger to ſatiety: neither will it be ſafe to indulge abſolute reſt immediately after exceſſive labour, nor ſuddenly fall to hard work after long idleneſs. In a word, therefore, all changes in the way of living ſhould be made by degrees.

It is alſo beneficial to vary the ſcenes of life, to be ſometimes in the country, ſometimes in town; to go to ſea, to hunt, to be at reſt now and then, but more frequently to uſe exerciſe; becauſe inaction renders the body weak and liſtleſs, and labour ſtrengthens it: but a medium is to be obſerved in all theſe things, and too much fatigue to be avoided; for frequent and violent exerciſe overpowers the natural ſtrength, and waſtes the body; but moderate exerciſe ought always to be uſed before meals. Now, of all kinds of exerciſe, riding on horſeback is the moſt convenient; or if the perſon be too weak to bear it, riding in a coach, or at leaſt in a litter: next follow fencing, playing at ball, running, walking. But it is one of the inconveniencies of old age, that there is ſeldom ſufficient ſtrength for uſing bodily exerciſe, though it be extremely requiſite for health: wherefore frictions with the fleſh-bruſh are neceſſary at this time of life, which ſhould be performed by the perſon himſelf, if poſſible; if not, by his ſervants.

Sleep is the ſweet ſoother of cares, and reſtorer of ſtrength; as it repairs and replaces the waſtes that are made by the labours and exerciſes of the day. But exceſſive ſleep has its inconveniencies; for it blunts the ſenſes, and renders them leſs fit for the duties of life. The proper time for ſleep is the night, when darkneſs and ſilence invite and bring it on: day ſleep is leſs refreſhing; which rule if it be proper for the multitude to obſerve, much more is the obſervance of it neceſſary for perſons addicted to literary ſtudies, whoſe minds and bodies are more ſuſceptible of injuries.

The ſofter and milder kinds of aliment are proper for children, and for youth the ſtronger. Old people ought to leſſen the quantity of their food, and increaſe that of their drink: but yet ſome allowance is to be made for cuſtom, eſpecially in the colder climates like ours; for as in theſe the appetite is keener, ſo is the digeſtion better performed. *Mead's Monita & Præcepta.*

DIET-DRINKS, a form in phyſic, including all the medicated wines, ales, and wheys, uſed in chronic caſes. They require a courſe or continuation to anſwer any intention of moment. In all acute caſes they are of no uſe, but where the diſorder of a conſtitution is gradually to be gained upon, much help may be had from this quarter.

DIET, or DYET, in matters of policy, is uſed for the general aſſembly of the ſtates or circles of the empire of Germany, and of Poland, to deliberate and concert meaſures proper to be taken for the good of the public.

DIETA, a term uſed in old writers for a day's journey.

DIETETIC, denotes ſomething belonging to diet, but particularly that part of phyſic which treats of this ſubject. See the article DIET.

DIEU ET MON DROIT, that is, God and my right, the motto of the royal arms of England, firſt aſſumed by king Richard I. to intimate that he did not hold his empire in vaſſalage of any mortal.

DIFFERENCE, in logic, ſingifies an eſſential attribute belonging to any ſpecies that is not found in the genus, and is the univerſal idea of that ſpecies: thus, body and ſpirit are two ſpecies of ſubſtance, which contain in their ideas ſomething more than is in that of ſubſtance. In a body, we find impenetrability and extenſion; in a ſpirit, a power of thinking and reaſoning; ſo that the difference of body is impenetrable extenſion, and the difference of a ſpirit is cogitation.

DIFFERENCE, in mathematics, is the remainder, when one number or quantity is ſubtracted from another.

DIFFERENCE *of Longitude* of two places on the earth, is an arch of the equator, comprehended between the meridians of theſe two places.

DIFFERENCE *of Aſcenſion.* See the article ASCENSIONAL *Difference.*

DIFFERENCES, in heraldry, certain additaments to coat-armour, whereby ſomething is added or altered to diſtinguiſh younger families from the elder.

DIFFERENTIAL CALCULUS, in mathematics, is a method of differencing qualities, or finding an infinitely ſmall quantity which, being taken infinite times, ſhall be equal to a given quantity, or an infiniteſimal, which is a portion of a quantity incomparable to that quantity; or, as others define it, the arithmetic of infinitely ſmall differences between variable quantities. The foundation then of this calculus is an infinitely ſmall quantity, or what is leſs than any aſſignable one; and therefore is accounted as nothing, the error occurring by omitting it, being leſs than any aſſignable one; hence two quantities, only differing by an infiniteſimal, may be taken as equal. Thus, in aſtronomy, the diameter of the earth is an infiniteſimal in reſpect to the diſtance of the fixed ſtars; and the ſame holds in aſtronomical quantities: the name infiniteſimal is therefore merely reſpective, and involves a relation to another quantity, not any real ens or being. Now infiniteſimals are called differentials, or differential quantities, when they are conſidered as the differences of two quantities. Sir Iſaac Newton calls them fluxions; conſidering them as the momentary increments of quantities, v. g. of a line generated by the flux of a point, or of a ſurface by the flux of a line, &c. The differential calculus, therefore, and the doctrine of fluxions, are the ſame thing under different names; the former given by M. Leibnitz, and the latter by Sir Iſaac Newton, who was moſt undoubtedly the original inventor: notwithſtanding, M. Leibnitz is by moſt of the foreigners allowed to have firſt diſcovered it, about the year 1676: but the contrary to this appears very evident by the report of the committee appointed to examine the original letters and copy-books of letters in the cuſtody of the Royal Society, relating to the diſpute then ſubſiſting between Sir Iſaac Newton and M. Leibnitz, concerning the invention of the method of fluxions.

Thoſe gentlemen, after having conſulted the letters and letter-books in the cuſtody of the Royal Society, and thoſe found among the papers of Mr. John Collins, dated between the years 1699 and 1677 incluſive; and ſhewed them to ſuch as knew and avouched the hands of Mr. Barrow, Mr. Collins, Mr. Oldenburgh, and Mr. Leibnitz, and compared thoſe of Mr. Gregory with one another, and with copies of ſome of them taken in the hands of Mr. Collins; found, 1. That Mr. Leibnitz was in London in the beginning of the year 1673, and went thence, in or about March, to Paris, where he kept a correſpondence with Mr. Collins, by means of Mr. Oldenburgh till about September 1676, and then returned by London and Amſterdam to Hanover; and that Mr. Collins was very free in communicating to able mathematicians what he had received from Sir Iſaac (then Mr.) Newton and Mr. Gregory.

2. That when Mr. Leibnitz was the firſt time in London, he contended for another differential method, properly ſo called; and notwithſtanding that he was ſhewn by Dr. Pell that it was Mouton's method, perſiſted in maintaining it to be his own invention, by reaſon that he had found it by himſelf, without knowing what Mouton had done before, and had much improved it: and we find no mention of his having any other differential method than Mouton's before his letter of the 21ſt of June 1677, which was a year after a copy of Mr. Newton's letter, of the 10th of December 1676, had been ſent to Paris to be communicated to him; and above four years after Mr. Collins began to communicate that letter to his correſpondents, in which letter the method of fluxions was ſufficiently deſcribed to any intelligent perſon.

3. That by Mr. Newton's letter of the 13th of June 1676, it appears that he had the method of fluxions above five years before the writing of that letter: and by his *Analyſis per Equationes Numero terminorum infinitas*, communicated by Dr. Barrow to Mr. Collins in July 1669, we find that he had invented the method before that time.

4. That the differential method is one and the ſame with the method of fluxions, excepting the name and mode of notation, Mr. Leibnitz calling thoſe quantities differences, which Mr. Newton calls moments or fluxions; and marking them with the letter *d*, a mark not uſed by Mr. Newton: and we (the committee) therefore take the proper queſtion to be, not who invented this or that method, but who was the firſt inventor of the method. And it is our opinion that thoſe, who have reputed Mr. Leibnitz the firſt inventor, knew little or nothing of his correſpondence with Mr. Collins and Mr. Oldenburgh long before, nor of Mr. Newton's having that method above fifteen years before Mr. Leibnitz began to publiſh it in the *Acta Eruditorum* of Leipſic.

The Engliſh, with Sir Iſaac Newton, inſtead of dx, write $\dot{x}$, (with a dot over it) for dy, $\dot{y}$, &c. which foreigners object againſt, on account of the confuſion of points, which they imagine ariſes when differentials are again differenced: beſides, the printers are more apt to overlook a point than a letter.

Stable quantities being always expreſſed by the firſt letters of the alphabet, $da=0$, $db=0$, $dc=0$; wherefore $d(x+y-a)=dx+dy$, and $d(x-y+a)=dx-dy$, ſo that the differencing of quantities is eaſily performed by the addition or ſubtraction of their compounds.

To difference quantities that mutually multiply each other, the rule is: Firſt, multiply the differential of one factor into the other factor, the ſum of the two factors is the differential ſought: thus, the quantities being xy, the differential will be $xdy+ydx$, i. e. $d(yx)=xdy+ydx$. Secondly, if there be three quantities which multiply each other, the factum of the two muſt then be multiplied into the differential of the third, thus: Suppoſe vxy: let $vx=t$, then $vxy=ty$, conſequently $d(vxy)=tdy+ydt$; but $dt=vdx+xdv$; theſe values therefore being ſubſtituted in the antecedent differential, $tdy+ydt$, the reſult is, $d(vxy)=vdxy+vydx+xydv$; hence it is eaſy to apprehend how to proceed where the quantities are more than three.

If one variable quantity x increaſe while the other y decreaſes, it is evident $ydx-xdy$ will be the differential of xy. To difference quantities that mutually divide each other, the rule is: Firſt, multiply the differential of the dividend into the diviſor; ſubtract the laſt product from the firſt, and divide the remainder by the ſquare of the diviſor; the quotient is the differential of the quantities mutually dividing each other. See FLUXION.

DIFFORM, *Difformis*, an appellation given to things whoſe appearance is irregular, in contradiſtinction to uniform.

It is much uſed in the deſcription of plants of the ſyngeneſia claſs, or thoſe with compound flowers, when the partial flowers, or ſmaller floſcules, happen to be of different kinds. See the article FLOWER.

DIFFUSE, an epithet applied to ſuch writings as are wrote in a prolix manner. Among hiſtorians, Salluſt is reckoned ſententious, and Livy diffuſe. Thus alſo among the orators, Demoſthenes is cloſe and conciſe; Cicero, on the other hand, is diffuſe.

DIFFUSION, the diſperſion of the ſubtile effluvia of bodies into a kind of atmoſphere all round them. Thus the light diffuſed by the rays of the ſun, iſſues all round from that amazing body of fire; and thus are the magnetic particles diffuſed every where round about our earth, and parts adjacent to it.

DIGAMMA, a name given to the letter F. See the article F.

DIGASTRICUS, in anatomy, a muſcle of the lower jaw, called alſo biventer. See the article BIVENTER.

DIGEST, *Digeſtum*, in matters of literature, a collection of the deciſions of the Roman lawyers properly digeſted, or arranged under diſtinct heads, by order of the emperor Juſtinian. It conſtitutes the firſt part or volume of the civil law.

DIGESTER, or DIGESTOR. See the article DIGESTOR.

DIGESTION, in phyſic, is the diſſolution or ſeparation of the aliments into ſuch minute parts as are fit to enter the lacteal veſſels, and circulate with the maſs of blood.

The word is derived from the Latin *digero*, to concoct. For the manner how digeſtion is performed, ſee BLOOD and CHYLE.

DIGESTION, in chemiſtry, is the ſubjecting bodies, included in proper veſſels, to the action of a gentle and continued heat.

The application of this operation, in regard to its end, is very various. In ſome caſes it is uſed with a view of producing a change in ſome one ſingle body, as in the inſtance of the preparation called mercurius præcip. per ſe; in others to promote ſolutions or other combinations; but moſt frequently for extraction, or ſeparation by means of fluids, of the required parts of ſome ſolid bodies, whoſe texture, impeding the quicker acceſs and effect of menſtrua, renders a long infuſion, and the relaxation of a gentle heat neceſſary, in order to their being penetrated; or for accelerating the ſolution of bodies by menſtrua, whoſe action, when cold, is not ſufficiently vigorous.

The veſſels generally uſed to contain the matter to be digeſted are matraſſes or bolt-heads, and ſometimes glaſs bodies; but where the heat is ſo gentle as to make no evaporation, the ſtructure is indifferent. In caſes where an evaporation does happen, and the exhaling fluid is of any value, the veſſels are to be conſtructed ſo as to confine the vapour, and return it in a condenſed ſtate. This is called circulation, and is commonly executed by inverting the neck of a ſmaller matraſs into that of a larger, in which caſe the conjoined glaſſes are called a pelican.

There are ſeveral other kinds of pelicans of a more complex ſtructure; but the flaſk uſed for Florence wine, diveſted of the ſtraw work, and inverted into a matraſs with a very long neck, will conveniently anſwer all the purpoſes.

This operation is moſt generally performed in a ſand-heat; and no greater adjuſtment of the degrees of heat is neceſſary for the purpoſes of pharmacy, than can be there effected: but formerly, when the more myſterious and operoſe methods were followed, the heat of dunghills has been employed.

The degree of heat requiſite in digeſtion, differs according to the nature of the ſubject: in tinctures made with ſtrong ſpirit of wine or volatile ſalts, and in ſolutions where a great effervеſcence is apt to ariſe, a very gentle one ſhould never be exceeded: in aqueous ſolutions, and moſt other caſes, a greater may be allowed: but it muſt always be underſtood to be leſs than will make the matter boil; otherwiſe the operation comes not within the proper meaning of the word digeſtion, which is a diſtinction from coction.

The time which digeſtion ought to be continued, differs ſo greatly according to the different application of the operation, that no other rule for it can be laid down, than that it ſhould be continued till the intention, to which it is made ſubſervient, be compleated.

In circulatory digeſtions, it is proper to lute the veſſels, to prevent the eſcape of the vapours through the junctures: but, in many caſes, this precaution is extremely neceſſary, that a ſmall aperture or vent be left; otherwiſe an incondenſible vapour which ariſes will, if it cannot force the lute, inevitably burſt the glaſſes. The inſtances in which this precaution is neceſſary, are all mixtures of acid ſpirits with earths, metals, or alkaline ſalts; or of ſuch ſalts of thoſe ſubſtances which can be acted on by them: but in ſolutions of ſalts in water, and in extracts of gums or reſins, made with volatile ſalts, wine, or ſpirits of wine, it may be ſafely omitted. The college of London have in their Diſpenſatory, as well according to the laſt edition as the former, uſed the word digeſtion, in a ſenſe different from that of the above definition; meaning by it only the ſuffering the ingredients of certain mixtures to be continued together, without applying the uſe of heat, which they expreſly order on each occaſion to be applied or omitted, by ſaying, digeſt with heat, or digeſt without heat. By this laſt technical uſe of the word, they confound the ſenſe of it with that of the word infuſe, and have deprived us of the eſtabliſhed name of a diſtinct operation, viz. the acting on bodies by a heat leſs than that of coction.

Digestion, in ſurgery, is the diſpoſing of an ulcer or wound to ſuppurate, or to diſcharge good pus, by the application of proper medicines.

DIGESTIVE, in medicine, ſuch remedies as ſtrengthen and increaſe the tone of the ſtomach, and aſſiſt in the digeſtion of foods. See the article Digestion.

To this claſs belong all ſtomachics and ſtrengtheners, or corroborants.

Digestive, in ſurgery, ſuch medicines as are applied to wounds, &c. in order to promote a good maturation and laudable ſuppuration of matter. Lenient, anodyne, and balſamic digeſtives, are to be applied to a gangrene. Digeſtives of turpentine, and the yolks of eggs, are uſeful in abſceſſes, wounds, and ulcers.

DIGESTOR, in chemiſtry, a ſtrong veſſel made of copper, or iron, fitted with a cloſe cover and ſcrews, ſo as to remain perfectly tight, in a conſiderable degree of heat; whilſt water, common air, and the ſubject of the operation are contained within.

Take a pound of freſh ox-bone in a ſingle piece, and two quarts of common water; then, a conſiderable ſpace being left for the atmoſpherical air, ſcrew them all up together in the digeſtor; and apply a moderate degree of heat to the bottom thereof, for about a quarter of an hour, or till a drop of cold water let fall upon the cover evaporate in a very few ſeconds of time: then letting all cool, upon opening the veſſel, the bone will be found ſoft and tender, ſo as to be cut with a knife, the water turned to a hard jelly about it, and a large quantity of fat in a ſolid cake at the ſurface.

The effects of this inſtrument will not appear ſurpriſing, if the forces that act within it be duly conſidered: for as the inſtrumental efficacy of fire, air, and water is very great, even ſeparate; no wonder they ſhould act extremely ſtrong upon a body, when in conjunction.

Hence the digeſter ſeems, of all the veſſels hitherto invented, the moſt powerful for increaſing the action of menſtruums; and if a ſuitable method can be diſcovered for ſtrengthening the engine, ſo as to work ſafely with a very ſtrong degree of heat; we might reaſonably expect, that ſome very extraordinary operations might be performed by its means, in the way of extraction, decoction, tincture, ſolution, and perhaps even deſtruction, or tranſmutation.

What effects the common ſolvents, as alcohol, oils, aqua-fortis, mercury, and metals themſelves, might have, when aſſiſted by this engine, is not eaſy to foretel, and requires much induſtry and application to diſcover.

DIGGING, among miners, is appropriated to the operation of freeing any kind of ore from the bed or ſtratum in which it lies, where every ſtroke of their tools turns to account; in contradiſtinction to the openings made in ſearch of ſuch ore, which are called hatches or eſſay-hatches, and the operation itſelf, tracing of mines, or hatching.

DIGIT, Digitus, in aſtronomy, the twelfth part of the diameter of the ſun, or moon, is uſed to expreſs the quantity of an eclipſe. Thus an eclipſe is ſaid to be of ſix digits, when ſix of theſe parts are hid.

Digit is alſo a meaſure taken from the breadth of the finger. It is properly ¾ of an inch, and contains the meaſure of four barley corns laid breadthwiſe.

DIGITALIS, fox-glove, in botany, a genus of plants, with a monopetalous and campanulated, or bell-faſhioned flower, quadrifid at the edge: the fruit is an oval, acuminated, and bilocular capſule, containing a great number of ſmall ſeeds.

DIGITATED, among botaniſts, an appellation given to compound leaves, each of which is compoſed of a number of ſimple foliola, placed regularly on a common petiole; though, ſtrictly ſpeaking, there muſt be more than four foliola to make a digitated leaf.

DIGITUS, Finger, in anatomy. See the article Finger.

DIGLYPH, in architecture, a kind of imperfect triglyph, conſole, or the like, with two channels or engravings, either circular or angular. See the article Triglyph.

DIGNITARY, in the canon law, a perſon who holds a dignity, that is, a benefice which gives him ſome pre-eminence over mere prieſts and canons. Such is a biſhop, dean, arch-deacon, prebendary, &c. See the articles Biſhop, Dean, &c.

DIGNITY, as applied to the titles of noblemen, ſignifies honour and authority.

DIHELIOS, in aſtronomy, a name given by Kepler to that ordinate of the ellipſis which paſſes through the focus where the ſun is ſuppoſed to be placed.

DIJAMBUS, in ancient poetry, a double iambus. See the article Iambus.

DIKE, a ditch, or drain, made for the paſſage of waters. See Ditch, &c.

Dike alſo ſignifies a work of ſtone, timber, earth, faſcines, &c. raiſed to oppoſe the entrance of the waters of the ſea, a river, lake, &c.

The moſt ſtupendous works of this kind are the dikes of Holland.

Dike-Reeve, an officer who takes care of the dikes and drains in Lincolnſhire.

DILAPIDATION, in law, a waſteful deſtroying or letting buildings, eſpecially parſonage-houſes, &c. run to decay, for want of neceſſary reparation. If the clergy neglect to repair the houſes belonging to their benefices, the biſhop may ſequeſter the profits thereof for that purpoſe: and in theſe caſes, a proſecution may be brought either in the ſpiritual court, or at common law, againſt the incumbent himſelf, or againſt his executor or adminiſtrator.

DILATATION, in anatomy, is when any paſſage or receptacle in the body, &c. is too much ſtretched or diſtended: and in general, it ſignifies a thing's taking up more ſpace than it did before.

The word is derived from the Latin *dilato*, to expand, or ſtretch out.

Dilatation, in ſurgery and anatomy, denotes the widening the orifice of a wound; or the diſtenſion of any veſſel, or the like.

DILATATORES, in anatomy, a name given to ſeveral muſcles in the human body; as 1. Dilatatores alæ naſi, a pair of muſcles which ſerve to elevate the noſe, and are very various in different ſubjects. In general, however, they are two on each ſide, though even in this they vary extremely, and ſometimes are ſo thin and fine as ſcarce to be perceptible. They are alſo called the pyramidalis and myrtiformis. See the article Pyramidalis, &c.

2. Dilatatores urethræ, of which the tranſverſi ariſe from the tubercle of the os iſchium on each ſide, and are inſerted into the poſterior part of the bulb of the urethra: they are not quite determinate and certain, however, either in their origin or inſertion, and ſometimes they are wholly wanting. When they act, they dilate the urethra in its poſterior part. The dilatator poſticus ariſes from the anterior part of the ſphincter of the anus, and is inſerted into the poſterior and lower part of the acceleratores, or elſe into the lower part of the bulb of the urethra. Some have taken this muſcle for a part of the ſphincter ani. See Sphincter.

DILEMMA, in logic, an argument conſiſting of two or more propoſitions, which divides the whole into all its parts, or members, by a disjunctive propoſition, and then infers ſomething concerning each part, which is finally referred to concerning the whole.

Inſtances of this are frequent, as "In this life we muſt either obey our vicious inclinations, or reſiſt them: to obey them will bring ſin and ſorrow; to reſiſt them is laborious and painful: therefore we cannot be perfectly free from ſorrow and pain in this life."

A dilemma becomes faulty, or ineffectual, three ways. Firſt, when the members of the diviſion are not well oppoſed, or not fully enumerated; for then the major is falſe. Secondly, when what is aſſerted concerning each part is not juſt, then the minor is not true. Thirdly, when it may be retorted with equal force upon him who utters it. There was a famous ancient inſtance of this caſe, wherein a dilemma was retorted. Euathlus promiſed Protagoras a reward when he had taught him the art of pleading; and it was to be paid the firſt day he gained any cauſe in court. After a conſiderable time, Protagoras goes to law with Euathlus for the reward, and uſes this dilemma. "Either the cauſe will go on my ſide, or on yours: if the cauſe goes on my ſide, you muſt pay me according to the ſentence of the judge: if the cauſe goes on your ſide, you muſt pay me according to your bargain. Therefore, whether the cauſe goes for me, or againſt me, you muſt pay the reward." But Euathlus retorted the dilemma thus: "Either I ſhall gain the cauſe, or loſe it. If I gain the cauſe, then nothing will be due to you according to the ſentence of the judge: but if I loſe the cauſe, nothing will be due to you according to my bargain. Therefore, whether I loſe or gain the cauſe, I will not pay you, for nothing will be your due."

A dilemma is uſually deſcribed, as though it always proved the abſurdity, inconvenience, or unreaſonableneſs of ſome opinion or practice, and this is the moſt common deſign of it. But it is plain, that it may be uſed to prove the truth or advantage of any thing propoſed. As "In heaven we ſhall either have deſires, or not: if we have no deſires, then we have full ſatisfaction: if we have deſires, they ſhall be ſatisfied as faſt as they ariſe: therefore, in heaven we ſhall be completely ſatisfied."

DILIGENZA, in muſic, is uſed for a ſoft or ſweet manner of ſinging or playing.

DILL, *Anethum*, in botany. See the article Anethum.

DIMACHÆ, in ancient military affairs, a kind of horſemen, anſwering to the dragoons of the moderns.

DIMENSION, in geometry, is either length, breadth, or thickneſs; hence a line hath one dimenſion, viz. length; a ſuperficies two, viz. length and breadth; and a body, or ſolid, has three, to wit, length, breadth, and thickneſs.

Dimension is alſo uſed with regard to the power of the roots of an equation, which are called the dimenſions of that root; as in a cubic equation, the higheſt power has three dimenſions, &c.

DIMINISHED Column, in architecture. See the article Column.

Diminished Interval, in muſic, is a defective interval, or an interval that is ſhort of its juſt quantity, by a leſſer ſemitone, &c. See Interval.

DIMINUTION, in architecture, a contraction of the upper-part of a column, by which its diameter is made leſs than that of the lower-part.

It generally commences from one third of the height of the column.

Vitruvius would have the diminution of columns different according to their height, and not according to their diameter: but this rule is not found to have been obſerved in the antique. Mr. Perrault obſerves, that a difference of orders does not infer a difference in diminutions, and Mr. Le Clerc ſays, all diminutions of columns ought to be more or leſs ſenſible, according as the orders are more or leſs delicate. For inſtance, in the Tuſcan order, where the column is fifteen modules high, the diminution under the aſtragal may be five minutes and a half. In the Doric order, where the column is ſixteen modules, the diminution may be but five minutes. In the Ionic, where the column is eighteen modules, the diminution may be but four minutes and a half; and in the Corinthian, no more than four. Diminutions are as differently adjuſted in antique buildings, as in different modern authors.

Diminution, in heraldry, a term uſed for what the French call briſures, and we denominate differences.

DIMINUTIVE, in grammar, a word formed from ſome other, to ſoften or diminiſh the force of it, or to ſignify a thing is little in its kind. Thus cellule is a diminutive of cell, globule of globe, hillock of hill. The Italians abound in diminutives: the French are a good deal more reſerved: in Engliſh we have very few. The Latins, and eſpecially Catullus, uſe them as expreſſions of blandiſhment, and in that language, as well as in the Italian, French, and Engliſh, they are generally formed from primitives by the addition of a few letters or ſyllables. They have a very pretty effect in that celebrated addreſs of Adrian to his departing ſoul, which begins,

Animula, vagula, blandula,
Hoſpes comeſque corporis, &c.

DIMISSORY Letters, in the ancient Chriſtian church, were letters granted to the clergy, when they were to remove from their own dioceſe, and ſettle in another, to teſtify that they had the biſhop's leave to depart.

DIMOERITÆ, in church hiſtory, a name given to the Apollinarians, from their ſeparating the underſtanding from the human ſoul of Chriſt.

DIOCESE denotes a particular diſtrict, or diviſion, under the direction and government of a biſhop.

England in regard to its eccleſiaſtical ſtate is divided into two provinces, viz. Canterbury and York, and each province into ſubordinate dioceſes, of which there are twenty-two in England, and four in Wales.

DIOCLESIAN Epocha, in chronology. See the article Epocha.

DIONYSIA, in Grecian antiquity, ſolemnities in honour of Διονυσος, or Bacchus, ſometimes called by the general name of orgia; and by the Romans, bacchanalia, and liberalia.

DIONYSIAN Period, in chronology. See the article Period.

DIOECIA, in the Linnæan ſyſtem of botany, the twenty-ſecond claſs of plants, comprehending all thoſe which have the male and female parts of fructification, or the ſtamina and piſtil, on diſtinct plants of the ſame kind; in which reſpect they bear ſome analogy to quadrupeds, whoſe males and females are likewiſe diſtinct. See BOTANY.

To this claſs belong the willow, hemp, poplar, juniper, piſtacchia, yew, &c. in all which, the female plants alone produce ſeeds; but even theſe prove barren, unleſs planted near the male plants, ſo as to be within the reach of the farina fæcundans. See FARINA.

DIOPTER, DIOPTRA, a name ſometimes uſed for the hole pierced in ſights of mathematical inſtruments. See SIGHTS.

DIOPTRA, among ſurgeons, the ſame with ſpeculum. See SPECULUM.

DIOPTRICS, the ſcience of refractive viſion, or that part of optics which conſiders the different refractions of light in its paſſing through different mediums, as air, water, glaſs, &c. and eſpecially lenſes.

DIOTA, a name uſed by ſome chemiſts for a circulating or double veſſel.

DIPHRYGES, in ancient pharmacy, the ſcoriæ, ſediment, or calx of melted copper, gathered in the furnace when the metal was run out.

DIPHTHONG, διφθογγος, in grammar, a double vowel, or the mixture of two vowels pronounced together, ſo as to make one ſyllable. See the article VOWEL.

The Latins pronounced the two vowels in their diphthongs ae or æ, oe or œ, much as we do, only that the one was heard much weaker than the other, though the diviſion was made with all the delicacy imaginable. Diphthongs with regard to the eyes, are diſtinguiſhed from thoſe with regard to the ears: in the former, either the particular ſound of each vowel is heard in the pronunciation, or the ſound of one of them is drowned; or, laſtly, a new ſound, different from either, reſults from both: the firſt of theſe only are real diphthongs, as being ſuch both to the eye and the ear. Diphthongs with regard to the ear are either formed of two vowels meeting in the ſame ſyllable, or whoſe ſounds are ſeverally heard; or of three vowels in the ſame ſyllable, which only afford two ſounds in the pronunciation.

Engliſh diphthongs, with regard to the eye and ear, are *ai*, *au*, *ea*, *ee*, *oi*, *oo*, *ou*. Improper Engliſh diphthongs, with regard to the eye only, are *aa*, *ea*, *eo*, *eu*, *ie*, *ei*, *oa*, *oe*, *ue*, *ui*.

DIPHYES, among natural hiſtorians, an appellation given to ſtones reſembling the male and female parts of generation in mankind.

DIPLASIASMUS, in medicine, a reduplication of diſeaſes.

DIPLASIASMUS is alſo uſed for two muſcles of the arm, which ſerve to turn it round.

DIPLOE, in anatomy, the ſoft meditullium, or medullary ſubſtance, which lies betwixt the two laminæ of the bones of the cranium. See CRANIUM.

DIPLOMA, an inſtrument or licence given by colleges, ſocieties, &c. to a clergyman to exerciſe the miniſterial function, or to a phyſician to practiſe the profeſſion, &c. after paſſing examination, or admitting him to a degree.

DIPPING, among miners, ſignifies the interruption, or breaking off, of the veins of ore; an accident that gives them a great deal of trouble before they can diſcover the ore again.

DIPPING NEEDLE, a long ſtraight piece of ſteel equally poiſed upon an axis parallel to the horizon, and afterwards touched with a load-ſtone, in order to diſcover the exact tendency of the magnetic virtue. A needle placed in this manner will dip below the horizon, or the touched part of it be directed to a point below the earth's ſurface; whence the name.

By ſeveral accurate experiments Mr. Graham has made it appear, that the quantity of the needle's inclination to the horizontal line was an angle of about 74 or 75 deg. that is, ſuppoſe A B (plate LIV. *fig.* 2.) a touched needle, ſupported on the point C, it will make an angle A C H, or B C O, with the horizontal line H O of 74 or 75 deg.

The learned Mr. Whiſton endeavoured to find the longitude at ſea by means of the dipping-needle, but without ſucceſs.

DIPSACUS, teaſel, in botany, a genus of
flower of which conſiſts of only one tubular
divided into four ſegments at the mouth: it
common receptacle, of a conical figure, beſe
ſcales, and containing a ſingle columnar ſeed
ginaceous rim.

The leaves of wild teaſel are recommen
flatulencies, and crudities of the ſtomach. Se

DIPSAS, in zoology, a ſpecies of ſerpen
from its bite creating a thirſt that proved mort

DIPTERE, or DIPTERON, in the ancie
ture, ſignified a temple ſurrounded with two
lumns, which form a ſort of porticos, called
iſles. Pſeudodiptere is the ſame, except tha
the double row of columns, this was only e
with a row of ſingle ones.

DIPTOTES, in grammar, are ſuch nou
only two caſes, as *ſuppetiæ*, *ſuppetias*, &c.

DIRECT, in arithmetic. The rule of t
is oppoſite to the rule of three inverſe. See
RULE OF THREE and PROPORTION.

DIRECT, in aſtronomy. A planet is ſaid t
when it appears to an obſerver on the earth to
in the zodiac, or according to the ſucceſſion c
See the article PLANET.

DIRECT RAY, in optics, is a ray flowing fr
of a viſible object directly to the eye, through
ſame medium.

DIRECT *Eaſt and Weſt Dials*, dials drawn
that directly face the eaſt and weſt points of th
or parallel to the meridian. See DIAL.

DIRECT *South and North Dials*, are thoſe
directly the north and ſouth points of the h
parallel to the prime vertical circle. See
DIAL.

DIRECT SPHERE. See SPHERE.

DIRECTION, in mechanics, ſignifies t
path of a body's motion, along which it end
proceed, according to the force impreſſed upo

ANGLE *of Direction*, that formed by the l
rection of two conſpiring powers.

Quantity of DIRECTION, a term uſed by ſo
maticians for the product of the velocity of th
center of gravity of a ſyſtem of bodies, by the
quantities of matter: this is nowiſe altered by
tions among the bodies themſelves.

Magnetical DIRECTION denotes the tenden
load-ſtone, and other magnetic bodies, to cert
called their poles: thus, a magnetical needle
ſents one of its ends towards the north-pole of
and the other towards the ſouth-pole.

DIRECTOR, in commercial polity, a p
has the management of the affairs of a trading
thus we ſay the directors of the India compa
ſea company, &c.

DIRECTOR, in ſurgery, a grooved probe, to
edge of the knife or ſciſſars in opening ſinuſes,
that by this means the ſub adjacent veſſels, n
tendons, may remain unhurt.

DIRIGENT, or DIRECTRIX, a term in
ſignifying the line of motion, along which the
line or ſurface is carried in the geneſis of an
ſolid figure.

DISBUDDING *of Trees* ſignifies the tak
ſuch branches or ſprigs, newly put forth,
placed.

DISBURDENING *of Trees*, the taking off
leaves and fruit, when too numerous, that tho
grow the larger.

DISC, *Diſcus*, in antiquity, a quoit made
iron, or copper, five or ſix fingers broad, and
a foot long, inclining to an oval figure, w
hurled in the manner of a bowl, to a vaſt diſta
help of a leathern thong tied round the per
who threw it, and put through a hole in the m

DISC, in aſtronomy, the body and face
and moon, ſuch as it appears to us on the eart
body or face of the earth, ſuch as it appears to
in the moon, &c. See DIAMETER.

The diſc in eclipſes is ſuppoſed to be di
twelve equal parts, called digits: in a total

the luminaries, the whole diſc is obſcured; in a partial eclipſe, only a part thereof.

If we imagine a plane to paſs through the center of the earth, ſo that the line which joins the centers of the ſun and earth, may be perpendicular to this plane, it will mark on the ſurface of the earth a circle, which will ſeparate the illuminated hemiſphere of the earth from the dark. This circle, otherwiſe termed the circle of illumination, Dr. Keil calls the illuminated diſc of the earth, which is directly ſeen by a ſpectator placed at the diſtance of the moon, in the right-line which joins the centers of the ſun and earth. All lines drawn from the center of the ſun to every ſingle point of the diſc, are to be accounted parallel; and, therefore, ſince that line which is drawn to the center of the diſc is perpendicular to it, all the reſt will be perpendicular to it; and therefore all lines drawn from the center of the ſun, and paſſing through every point of any circle upon the earth's ſurface, when they are produced, will be perpendicular to the plane of the diſc. Moreover, a ſpectator in the moon will ſee all countries, cities, and towns, to move upon the diſc, which motion is occaſioned by the earth's rotation round its axis, and every point will have its path on the diſc: the bigneſs of the earth's diſc is to be eſtimated by the angle under which the earth is ſeen from the moon. See the article EARTH.

DISC, in botany, is an aggregate of florets forming, as it were, a plane ſurface.

DISC, in optics, is the width of the aperture of teleſcope glaſſes, whatever their form be, whether plane, convex, concave, &c.

DISCERNING, or DISCERNMENT, among logicians, a faculty of the mind, whereby it diſtinguiſhes between ideas. See JUDGMENT and INTUITION.

DISCIPLE, one who learns any thing from another: thus, the followers of any teacher, philoſopher, &c. are called diſciples. In the Chriſtian ſenſe they were followers of Chriſt, in general; but in a more reſtrained ſenſe, the diſciples denote thoſe alone who were the immediate followers and attendants on his perſon, of which there were ſeventy or ſeventy-two.

DISCIPLINE, in a general ſenſe, ſignifies inſtruction and government, as military diſcipline, eccleſiaſtical diſcipline, &c.

Eccleſiaſtical diſcipline conſiſts in putting thoſe laws in execution by which the church is governed.

DISCLAIMER, in law, is a plea wherein is contained an expreſs denial of a thing; as where upon the diſtreſs of a lord, a tenant ſues a replevin, and the lord avows the taking, by alleging the tenant holds of him as of his lord, and that he diſtrained for the rent unpaid, or ſervice not performed: in this caſe, if the tenant denies that he holds of him, this is called a diſclaimer; and on that account, if the lord proves the tenant to hold of him, the tenant, on a writ of right, ſhall loſe his land.

DISCORD, in muſic, the relation of two ſounds which are always and of themſelves diſagreeable, whether applied in ſucceſſion or conſonance. Thus the ſecond, fourth, and ſeventh, with their octaves, and, in general, all intervals, except thoſe few which preciſely terminate the concords, are called diſcords. Diſcords are diſtinguiſhed into concinnous and inconcinnous intervals. See the article INTERVAL.

Concinnous DISCORDS, called by the ancients emmeli, are ſuch as are fit for muſic, next to and in combination with concords. Theſe are relations which in themſelves are neither very agreeable nor diſagreeable, and have only a good effect in muſic, as by their mixture and combination with the more natural and eſſential principles, they produce a variety neceſſary to our being better pleaſed.

Inconcinnous DISCORDS, by the ancients called ecmeli, are ſuch as are never choſen in muſic, as having too great a harſhneſs in them, though even the greateſt diſcord is not without its uſe. The eſſential principles of harmony, harmonical intervals, or concords, are in number only eight: the indefinite numbers of other ratios are all diſcords. Hence Mr. Malcolm ſhews the neceſſity of taking ſome of the leſs untoward of theſe diſcords into the ſyſtem of muſic.

The harmony of diſcords is that wherein the diſcords are made uſe of as the ſolid and ſubſtantial part of the harmony: for by a proper interpoſition of a diſcord, the ſucceeding concords receive an additional grace. Thus the diſcords are in muſic, what ſtrong ſhades are in painting. See the article HARMONY.

The diſcords are the fifth when joined with the ſixth, the fourth with the fifth. The ninth of its own nature is a diſcord; ſo is the ſeventh. The diſcords are introduced into harmony with due preparations, and muſt be ſucceeded by concords, which is the reſolution of diſcords.

DISCOVERY, in dramatic poetry, a manner of unravelling a plot, or fable, in tragedies, comedies, and romances, wherein, by ſome unforeſeen accident, a diſcovery is made of the name, fortune, quality, &c. of a principal perſon, which were before unknown. See CATASTROPHE.

DISCOUNT, in commerce, a term among traders, merchants, and bankers. It is uſed by the two former on occaſion of their buying commodities on the uſual time of credit, with a condition that the ſeller ſhall allow the buyer a certain diſcount at the rate of ſo much per cent. per annum, for the time for which the credit is generally given, upon condition that the buyer pays ready money for ſuch commodities, inſtead of taking the time of credit. Traders and merchants alſo frequently taking promiſſory notes for monies due, payable to them or order at a certain time; and ſometimes having occaſion for money before the time is elapſed, procure theſe notes to be diſcounted by bankers before the time of payment; which diſcount is more or leſs, according to the credit and reputation of the perſon who drew the note, and the indorſer or indorſers. Bills of exchange are alſo diſcounted by bankers; and in this conſiſts one article of the profits of banking.

DISCOUS FLOWERS, thoſe furniſhed with a diſc. See the article DISC.

DISCRETE, or DISJUNCT PROPORTION, is when the ratio of two or more pairs of numbers or quantities is the ſame, but there is not the ſame proportion between all the four numbers. Thus, if the numbers 3 : 6 :: 8 : 16 be conſidered, the ratio between 3 : 6 is the ſame as that between 8 : 16, and therefore the numbers are proportional; but it is only diſcretely or disjunctly, for 3 is not to 6 as 6 to 8; that is, the proportion is broken off between 8 and 3, and is not continued as in the following continual proportionals, 3 : 6 :: 12 : 24. See PROPORTION.

DISCRETE QUANTITY, ſuch as is not continuous and joined together. Such is a number whoſe parts being diſtinct units, cannot be united into one continuum; for in a continuum, there are no actual determinate parts before diviſion, but they are potentially infinite.

DISCRETIVE PROPOSITIONS, are thoſe where various judgments are made and denoted by the particles *but*, *notwithſtanding*, &c. either expreſſed or underſtood. Thus, "Fortune may deprive me of my wealth, but not "of my virtue," is a diſcretive propoſition.

DISCUS, in antiquity, an inſtrument uſed by the ancients in their public games.

DISCUSSION, in matters of literature, ſignifies the clear treating or handling of any particular point, or problem, ſo as to ſhake off the difficulties with which it is embarraſſed: thus we ſay, Such a point was well diſcuſſed, when it was well treated of, and cleared up.

DISCUSSION, in a medicinal ſenſe, the ſame with diaphoreſis. See DIAPHORESIS.

DISCUTIENTS, in medicine, are ſuch remedies as, by their ſubtility, diſſolve a ſtagnating or coagulated fluid, and diſſipate the ſame without an external ſolution of continuity.

DISDIAPASON, or BISDIAPASON, in muſic, a compound concord, deſcribed by F. Parran, in the quadruple ratio of 4 : 1, or 8 : 2.

DISDIAPASON-DIAPENTE, a concord in a ſextuple ratio of 1 : 6.

DISDIAPASON-SEMI-DIAPENTE, a compound concord in the proportion of 16 : 3.

DISDIAPASON-DITONE, a compound conſonance in the proportion of 10 : 2.

DISDIAPASON-SEMI-DITONE, a compound concord in the proportion of 24 : 5.

DISEASE, in medicine, that ſtate of a living body wherein it is deprived of the exerciſe of any of its functions, whether vital, natural, or animal.

Several authors have given us compendious theories of diſeaſes. Bontekoe deduces all human diſeaſes from the ſcorbutus; Muſgrave from the arthritis; Dr. Woodward from the bile; ſome from the venereal virus, which has lurked in the ſeed ever ſince the ſin of Adam; ſome from extraneous ferments formed in or out of us, and ſome from worms.

As the actions or conditions of the body, ſo alſo the diſeaſes or defects thereof may be reduced to three general heads, viz. thoſe of the ſolids and fluids, and thoſe compounded of both.

The ſolids, that is, the bones and fleſh, may be diſordered five ways, viz. rendered turgid by tumours, cut by wounds, corroded by ulcers, &c. removed out of their places, or diſcontinued by fractions and contuſions.

Diſeaſes of the fluids are in the blood or ſpirits; thoſe of the blood are two, ſuch as thicken and retard its motion, or ſuch as attenuate and accelerate it. To the laſt kind the fever and feveriſh affections only belong. All other diſeaſes of the blood belong to the former.

The diſeaſes of the animal ſpirits ariſe either from an intermiſſion or retardation of their motion, or a diminution of their quantity, or diſorder in their quality. Laſtly, diſeaſes of the fluids, whether thoſe of the blood or ſpirits, are ſeldom long confined thereto, but preſently come to diſturb and impede ſome of the functions of the ſolid parts, and at laſt corrupt the ſubſtance of the ſolids themſelves: hence ariſe compound or complicated diſeaſes, which are infinitely various. The learned Boerhaave furniſhes us with an accurate and ſcientifical diviſion of diſeaſes into thoſe of the ſolids and fluids, to whom we ſhall refer the reader.

All diſeaſes are owing to the bad regulations of our lives, either from too much or too little ſleep, too much or too little exerciſe, &c. Sometimes they are cauſed by things without, and very often by an abuſe of food, that is, by our intemperance in eating and drinking, which is ſo much the more injurious to us, becauſe it affects us inwardly.

Mr. Hacquet rejects the ſyſtem of the materialiſts, who conſider all diſeaſes as *entia nova*, or new productions, and endeavours to account for all new modifications on a deſtruction of proportions, or a change in the ſtructure of parts. He ſuppoſes the preſſure, ſtructure, and convulſion of the nerves affecting the fluids, to be the principal cauſe of diſtempers; and undertakes to prove, that the firſt operation of poiſons and infections is on the ſpirits, and from them communicated to the blood. In this he thinks he follows the opinion of a celebrated ſect among the ancients, called Pneumatics, who attributed all diſeaſes to a diſorder in the ſpirits, and of the texture of the pores of the parts; for which reaſon they placed their chief confidence in metaſyncritical medicines, which according to them reinſtated theſe pores in their proper ſituation. The above author names ſome of the moſt celebrated moderns as founding the whole of their practice upon the nervous ſyſtem, and the continual propenſity of thoſe ſolids to convulſive irritations, and conſequently owning that the ſole buſineſs of a phyſician is to learn how to manage the tonic motion of the parts, and give it a proper turn. In order to direct the neceſſary remedies for all diſeaſes, Mr. Hacquet undertakes, in the laſt place, to treat of them in their natural order; in this he conſiders ſuch as are incident to the human body in its firſt year, and goes on progreſſively to thoſe which attack it towards the cloſe of life. This treatiſe is performed in a new and ingenious manner.

Diſeaſes themſelves we find are often uſeful; for the blood in a fever, if well governed, like wine upon a fret, diſchargeth itſelf of all heterogeneous mixture; and nature, the diſeaſe, and remedies clean all the rooms in the houſe, whereby that which threatens death, tends to the prolonging of life; and as diſeaſes miniſter ſometimes to health, ſo to other good uſes in the body, ſuch as quickening the ſenſes, of which we may find inſtances.

Endemic Diseases. See the article Endemic.

Epidemic Diseases. See Epidemic *Diſeaſes*.

DISFRANCHISING, among civilians, ſignifies the depriving a perſon of the rights and privileges of a free citizen or ſubject.

DISGORING, in the manege, the diſperſing an inflammation or ſwelling.

DISGUISE, a counterfeit habit. Perſons doing unlawful acts in diſguiſe, are by our ſtatutes ſometimes ſubjected to great penalties, and even declared felons. Thus by an act, commonly called the Black Act, perſons appearing diſguiſed and armed in a foreſt, or grounds incloſed, or hunting deer, or robbing a warren or a fiſh-pond, are declared felons.

DISH, among miners, denotes a wooden meaſure, wherein they are obliged to meaſure their ore; it is kept by the bar-maſter, and contains about 672 ſolid inches.

DISJUNCTIVE, ſomething that ſeparates or disjoins. Thus, *or*, *neither*, &c. which in connecting a diſcourſe yet ſeparate the parts of it, are called disjunctive conjunctions.

Disjunctive Proposition, in logic, is that where of ſeveral predicates we affirm one neceſſarily to belong to the ſubject to the excluſion of all the reſt, but leave that particular one undetermined. Such is the major of the following disjunctive ſyllogiſm.

> The world is either ſelf-exiſtent, or the work of ſome finite, or of ſome infinite, being.
> But it is not ſelf-exiſtent, nor the work of a finite being.
> Therefore it is the work of an infinite being.

DISK, or Disc. See the article *Disc*.

DISLOCATION, in ſurgery, the ſame with luxation. See Luxation.

DISMEMBERED, in heraldry, is applied to birds that have neither feet nor legs, and alſo to lions and other animals whoſe members are ſeparated.

DISMOUNTING, in the military art, the act of unhorſing. Thus, to diſmount the cavalry, dragoons, &c. is to make them alight.

Dismounting Cannon, is the breaking their carriages, wheels, axle-trees, or any thing elſe, ſo as to render them unfit for ſervice.

DISPART, in gunnery, is the ſetting a mark upon the muzzle ring, or thereabouts, of a piece of ordnance, ſo that a ſight-line taken upon the top of the baſe-ring againſt the touch-hole, by the mark ſet on or near the muzzle, may be parallel to the axis of the concave cylinder. The common way of doing this, is to take the two diameters of the baſe-ring, and of the place where the diſpart is to ſtand, and divide the difference between them into two equal parts, one of which will be the length of the diſpart which is ſet on the gun with wax or pitch, or faſtened there with a piece of twine or marlin. By means of an inſtrument it may be done with all poſſible nicety.

DISPENSARY, or Dispensatory, denotes a book containing the method of preparing the various kinds of medicines uſed in pharmacy. Such are thoſe of Bauderon, Quercetan, Zwelfer, Charas, Bates, Meſue, Salmon, Lemery, Quincy, &c but the lateſt and moſt eſteemed are the Edinburgh and London Diſpenſatories.

Dispensary, or Dispensatory, is likewiſe a magazine or office for ſelling medicines at prime coſt to the poor.

DISPENSATION, in law, the granting a licence of doing ſome certain action that otherwiſe is not permitted.

DISPERSION, in general, ſignifies the ſcattering or diſſipating ſomething. Hence,

Dispersion, in optics, the ſame with the divergency of the rays of light.

Point of Dispersion, in dioptrics, the point from which refracted rays begin to diverge, where their refraction renders them divergent. See Refraction.

Dispersion *of Inflammations*, in medicine and ſurgery, is the removing the inflammation, and reſtoring the inflamed part to its natural ſtate.

DISPONDEE, *Diſpondæus*, in the Greek and Latin poetry, a double ſpondee or foot, conſiſting of four long ſyllables, as θαυμαζοντες, mæcēnātēs, conclūdēntēs.

DISPOSITION, in architecture, the juſt placing the ſeveral

everal parts of an edifice, according to their proper nature and office.

Disposition, in rhetoric, the placing words in ſuch an order as contributes moſt to the beauty and ſometimes even to the ſtrength of a diſcourſe.

DISPROPORTION, a general term for any kind of irregularity, or want of proportion in the parts of a thing.

DISSECTION, in anatomy, the cutting up a body, with a view of examining the ſtructure and uſe of the parts. See the article Anatomy.

DISSEISIN, in law, an unlawful diſpoſſeſſing a perſon of his lands or tenements. It is of two ſorts, either ſingle diſſeiſin, which is committed without force of arms, or diſſeiſin by force of arms, more properly termed deforcement. See Deforcement.

The diſturbing a perſon from entering on his land, or hindering him from tilling it, are both diſſeiſins of land; and denial of rent, when lawfully demanded, is a diſſeiſin of the rent.

DISSENTERS, ſeparatiſts from the ſervice and worſhip of the church of England. See the articles Presbyterians, Anabaptists, &c.

DISSIMILAR, in general, an appellation given to things which are unlike: thus the ſeminal or firſt leaves of plants, are called diſſimilars, as being generally of a different figure from thoſe of the grown plants

Dissimilar Parts, in anatomy, thoſe compounded of parts of various ſtructure, ſuch are all the limbs of the body

DISSIMILITUDE, in general, denotes whatever conſtitutes the difference between two diſſimilar things. See Dissimilar and Similitude.

Dissimilitude, in rhetoric, an argument wherein from diſſimilar or unlike things, other diſſimilars are deduced, as in the following argument from Catullus.

> *Soles occidere & redire poſſunt.*
> *Nobis cum ſemel occidit brevis lux,*
> *Nox eſt perpetua una dormienda.*
> *Voſſ. de Inſtitut. Orator.*

DISSIPATION, in phyſics, an inſenſible loſs or conſumption of the minute parts of the body; or that flux whereby they fly off, and are loſt. See Effluvia.

Circle of **Dissipation**, in optics, is uſed for that circular ſpace upon the retina, which is taken up by one of the extreme pencils or rays iſſuing from an object.

The conſideration of the circles of diſſipation, formed by the rays coming from the extremities of objects, is of uſe to account for ſeveral curious phœnomena of viſion. *Smith's Optics.*

Univerſal **DISSOLVENT**. See the article Alkahest.

DISSOLUTION, in chemiſtry, the ſame with ſolution. See the article Solution.

Dissolution, in muſic, is when a ſound in the enharmonic genus is lowered three dieſes; for thereby that genus is diſſolved, and the muſic, or that interval at leaſt, is chromatic.

DISSONANCE, in muſic, the ſame with diſcord. See the article Discord.

DISSYLLABLE, among grammarians, a word conſiſting only of two ſyllables: ſuch are nature, ſcience, &c.

DISTAFF, an inſtrument about which flax is tied in order to be ſpun.

DISTANCE, the interval between two things, either with regard to time, place, or quantity.

Thus we ſay, the diſtance of the creation of the world, from the nativity of Jeſus Chriſt, is upwards of 4000 years: the diſtance between the Creator and creature is infinite.

Distances, in geometry, are meaſured by the chain, decempeda, and the like. See Chain.

Distance, in geography, is the arch of a great circle interſected between two places.

Distance, in navigation, is the number of miles, or leagues, that a ſhip has ſailed from any point. See Sailing.

Distance, in aſtronomy. The diſtance of the ſun, planets, and comets, is found from their parallax. That of the fixed ſtars, as having no ſenſible parallax we can do little more than gueſs at.

Distance *of the Sun from the Moon's Node, or Apogee*, is an arch of the ecliptic intercepted between the ſun's true place and the moon's node, or apogee. See Node.

Distance *of the Eye*, in perſpective, is a line drawn from the eye to the principal point.

Curtate **Distance**, in aſtronomy, is the diſtance of the planet's place, reduced to the ecliptic, from the ſun.

Point of **Distance**, in perſpective, is a point in the horizontal line at ſuch diſtance from the principal point, as is that of the eye from the ſame.

Distance *of the Baſtions*, in fortification, is the ſide of the exterior polygon. See Polygon.

DISTASTE properly implies an averſion or diſlike to certain foods, and may be either conſtitutional, or owing to ſome diſorder of the ſtomach; in which laſt caſe emetics are recommended.

DISTEMPER, among phyſicians, the ſame with diſeaſe. See Disease.

Distemper, in painting, a term uſed for the working up of colours with ſomething beſides water or oil. If the colours are prepared with water, that kind of painting is called limning; and if with oil, it is called painting in oil, and ſimply painting. If the colours are mixed with ſize, whites of eggs, or any ſuch proper glutinous, or unctuous matter, and not with oil, then they ſay it is done in diſtemper.

In this manner the admirable cartoons, late at Hampton-court, but now at the queen's palace, are painted. The greateſt diſadvantage of diſtemper is, that it has no glittering, and all its colours look dead, by which means they appear alike in all ſorts of lights, which oil colours, or even colours in diſtemper, when varniſhed, do not.

Distemper, or **Distemperature** *of Trees*. See Tree.

DISTICH, *διϛιχον*, a couplet of verſes making a complete ſenſe. Thus hexameter and pentameter verſes are diſpoſed in diſtichs.

DISTICHIASIS, in ſurgery, a diſeaſe of the eye-lids, when under the ordinary eye-laſhes there grows another extraordinary row of hair, which frequently eradicates the former, and pricking the membrane of the eye, excites pain, and brings on a defluxion. It is cured by pulling out the ſecond row of hairs with nippers, and cauterizing the pores out of which they iſſued.

The word is derived from the Greek, *δις*, ſignifying double, and *ϛιχος*, order.

DISTILLATION is the condenſing and collecting in a fluid form, by a proper apparatus, the ſteam or vapour of bodies previouſly rarified, by the application of heat.

The word is derived from the Latin, *diſtillo*, to drop leiſurely.

The principle on which this operation is formed, is too obvious to demand any illuſtration; ſince the evaporation of fluids by heat, and their reduction into their former ſtate, as they grow cold again, are facts which fall within the notice of every one.

The end of diſtillation is of two kinds: the firſt, and by far the moſt general, is for the ſeparation or extraction of ſome required bodies from others, with which they were mixed, as in the caſe of vinous and volatile ſpirits, and eſſential oils. The other is for the quicker and more effectual combination of ſuch bodies whoſe mixture is aſſiſted by a boiling heat; as in the caſe of Spir. nitr. dulc.

Diſtillation is performed by ſeveral kinds of apparatus, for all which the general name is an alembic; to form each kind whereof, two or more veſſels are conjoined.

The veſſels required are of three kinds: a proper body or reſervoir to contain the matter while the heat acts on it; a refrigerant to condenſe the vapour as it riſes, and a receiver to contain it, when condenſed. Theſe three intentions are, in moſt kinds of alembics, executed by three diſtinct veſſels: but in the inſtance of the retort and receiver, the whole is effected by two; the neck of the retort, and the increaſed magnitude of the receiver, performing the office of a condenſer.

The alembics moſt generally in uſe are the worm-ſtill and retorts: the firſt is of modern invention, and may be eſteemed as one of the moſt conſiderable improvements of the chemical art; ſince it has furniſhed a method of executing, in ſeveral caſes, one of the moſt uſeful operations with the greateſt convenience and expedition, and with an extent, in regard to quantity, that has no limitation; whereas the kind of ſtills uſed before for the ſame purpoſes, from the defect of a greater ſurface, were liable to have the condenſers heat beyond the condenſing point; and hence to be blown off, with great loſs of the matter, and danger to the operator: but their uſe is ſo ſuperſeded by the worm-ſtill, that it will anſwer no end to be particular in regard to them. The apparatus we have repreſented in plate XXXIX. *fig.* 33, where one common refrigeratory condenſes the vapours ariſing from the two ſtills *a b*, *e d*.

The other general method is by the uſe of retorts and receivers, which will very commodiouſly perform all kinds of diſtillations, where the limitation of quantity and time are not of importance; but in ſuch caſes they muſt give place to the worm ſtill, in regard to thoſe ſubſtances that admit of its uſe; the defects of the other being entirely remedied in this. In all theſe inſtances, however, where the corroſive power of the matter permits the uſe of glaſs only, retorts are preferable to every other kind of alembic hitherto invented. In the diſtillation of different ſubſtances, and for different ends, the form of the retorts ought to vary: for the diſtillation of acid ſpirits, whoſe fumes can be ſuſpended only in a great degree of heat, they ſhould be made with a larger bulb, and low long neck, and placed deep either in the fire or the ſand, that the vapour may paſs into the depending part of the neck, and not circulate in the body of the retort: but when retorts are employed for the rectification of volatile ſpirits, vinous ſpirits, or etherial oils, as thoſe of turpentine or amber, the contrary is then proper, that the body being tall, and riſing far out of the ſand, may condenſe the vapour of the groſſer and heavier matter, and ſuffer the more volatile to paſs pure into the neck. The manner of placing the retorts for diſtillation we have repreſented in plate XXXIX. *fig.* 27, 28, and 31; where *a*, *k*, *q*, repreſent the retorts placed in the furnaces, and *g*, *h*, *p*, the receivers.

The greateſt part of the diſtillations in retorts may be made in a ſand-heat, which, indeed, is moſt ſuitable to them: but where a very intenſe degree of heat is required, the retort, being firſt coated with a proper lute, muſt be ſet in the naked fire; but they are much leſs manageable in this way than when placed in ſand. They are to be fixed, however, by means of a rim, formed of a lute, and projecting from it in ſuch a manner, that the retort may hang thereby when it is put into the furnace. But great care muſt be taken that the lute be thoroughly dry, and the texture of the rim of a ſufficient tenacity, before the fixing the retort be attempted; for otherwiſe an unavoidable deſtruction of it will follow. But unleſs in experiments for which coated retorts may well enough ſerve the purpoſe, the methods mentioned below, of iron pots, or earthen long necks, are to be preferred.

Glaſs bodies, with condenſing heads and receivers, were likewiſe formerly in frequent uſe; and many proceſſes in the old Pharmacopœias are directed to be performed by them: but later experience has almoſt baniſhed them from the preſent practice; for there are ſcarcely any of the proceſſes now in uſe, but may with more convenience be performed by retorts properly managed. This apparatus we have repreſented in plate XXXIX. *fig.* 7.

For the diſtillation of animal ſubſtances, acid ſpirits from ſalts, and ſuch bodies as require a great degree of heat, when larger quantities are demanded, a deep iron pot, with an head of caſt iron, or earthen ware, is employed; to which is ſometimes fitted, for the increaſe of a condenſing furnace, a large earthen jar, with a receiver fixed to it: but where only ſmaller quantities are deſired, a coated retort, placed in the fire, with a large receiver adapted to it, may ſerve the ſame end. The former of theſe methods is repreſented in plate XXXIX. *fig.* 22, where B is the furnace, containing the iron pot, *c* the head, and *b*, *b*, two receivers.

Earthen-pots, called long-necks, are likewiſe uſed for the diſtillation of aqua-fortis, and other bodies which require a very great heat: but they are now much diſuſed in pharmacy; oil of vitriol being made by perſons who carry on large works, and aqua-fortis, by moſt of thoſe who want it for the purpoſes of medicine, by Glauber's method, which admits of the uſe of retorts in ſand. Long necks are placed naked in the fire, and the necks being put through a hole in the ſide of the furnace, a receiver is there fixed to them. See plate XXXIX. *fig.* 1, where *b*, *b*, *b*, *b*, are the necks of the long necks, the bodies being placed within the furnace; and *a*, *a*, *a*, *a*, receivers adapted to them.

Theſe are the general methods by which diſtillation is performed; though, for particular proceſſes, others have been contrived; as the bell for the diſtillation of oil of ſulphur; and the refiner's alembic for quick-ſilver: but as they relate only to thoſe ſingle proceſſes, we ſhall not deſcribe them here. There is, however, one manner of diſtillation, which though, perhaps, not abſolutely neceſſary in any of the proceſſes of pharmacy, yet being directed frequently in moſt Pharmacopœias, and in ſome caſes in all, ought therefore to be underſtood: it is the conveying heat to the diſtilled matter, by the medium of water, in order to the nicer regulation thereof, and is called diſtillation in balneo mariæ. It is not conveniently practicable with glaſſes; and therefore performed by putting a ſmall metalline ſtill into another veſſel, properly formed to boil water, with which its vacuity left by the ſtill is filled.

The ſubſtances proper to be diſtilled by the worm-ſtill are vinous ſpirits, ſimple waters, oil of turpentine, and other etherial eſſential oils, when made with water.

The ſubſtances proper to be diſtilled in retorts are acid ſpirits, when made by Glauber's methods; ſpiritus nitri dulcis, volatile ſpirits, and ſeveral others of particular kinds, as wax, amber, and antimony, when diſtilled with mercury ſublimate for the butter; mercury per ſe is ordered alſo, by the college of London, to be diſtilled in retorts; but, without a particular management, it is impracticable, and in all caſes troubleſome, and leſs eligible than the method uſed by the refiners; for which ſee PURIFICATION *of Mercury*.

Animal ſubſtances, when in quantities, require to be diſtilled in an iron-pot; and aqua-fortis, when made from crude vitriol, either in the ſame or long-necks; only the aqua-fortis being the leſs volatile, and requiring the more heat, the veſſel uſed for the diſtillation of it muſt be ſet deeper in the fire than thoſe uſed for any animal ſubſtances.

Diſtillation in balneo mariæ, being neceſſarily confined to thoſe ſubſtances which will riſe with a leſs degree of heat than will make water boil, is therefore only proper for etherial or eſſential oils, volatile ſpirits, and vinous ſpirits. The New London Diſpenſatory orders this method to be uſed for the ſpirits of lavender and roſemary; and the Edinburgh Diſpenſatory directs it for the ſpirit of ſcurvy-graſs, the compound ſpirit of lavender, and the ſaline aromatic ſpirit. But a gentle ſand-heat, if the fire be timely ſuppreſſed, when the proper quantity of the matter is come over, is as effectual, and more commodious.

The firſt ſubject of caution, in regard to diſtillation, is to take care to leave ſufficient room, in the containing veſſel, or body, for the expanſion and ebullition of the matter to be diſtilled; otherwiſe it is very apt to overflow in the neck, and break the veſſels, if of glaſs; hazard the firing the building, in the caſe of vinous ſpirits; and fruſtrate the operation in all. This is to be particularly guarded againſt in the diſtillation of aqua-fortis and ſpirit of ſalt by Glauber's method, and of amber; as alſo in the rectification of the ſpirit of hartſhorn; all of which, eſpecially in the beginning of the operation, are extremely ſubject to make a very great ebullition, and to froth up in the neck of the retort. In theſe caſes, therefore, at leaſt one third of the retort ſhould be left unfiled; and even then, without a very careful management of the fire, they are not exempt from danger. Another requiſite caution is, that the condenſing ſurface be ſufficiently large, and the heat accommodated to it; for if an error of this kind occur in the caſe of the worm-ſtill, the head will be blown off, and the vapour diſſipated, with conſiderable loſs; and if in that of vinous ſpirits, to the great danger of thoſe who may happen to be in the place.

It is neceſſary, likewiſe, in diſtillation, as well as digeſtion, to avoid luting the veſſels too cloſely with any tenacious ſubſtance; for if a ſufficient vent be not left for the eſcape of the air, which is generated during the diſtillation of ſome kinds of ſubſtances, as alſo for the expanſion, which attends the increaſe of heat of that air which is included in the veſſels at the time of their junction, the veſſels will be in extreme danger of being burſt with great violence.

DISTILLERY, the art of diſtilling brandies, and other ſpirits. See DISTILLATION.

To this art likewiſe belong the peculiar proceſſes of brewing and fermentation, the knowledge of proper additions, and the rectification of ſpirits. See the articles BREWING, FERMENTATION, ADDITIONS, and RECTIFICATION.

DISTINCT NOTION, or IDEA, is that wherein the mind perceives a difference from all other ideas.

DISTINCT BASE, in optics, is that diſtance from the pole of a convex glaſs, in which objects beheld through it appear diſtinct and well deſcribed, ſo that it is the ſame with the focus. See FOCUS.

DISTINCTION, in logic, is an aſſemblage of two or more words, whereby different things, or their conceptions, are denoted.

DISTORTER ORIS, in anatomy, a muſcle otherwiſe called zygomaticus. See the article ZYGOMATICUS.

DISTRAINING, in law, the ſame with attaching. See the article ATTACHING.

DISTRESS, in law, the ſeizing or diſtraining any thing for rent in arrear, or other duty unperformed.

DISTRIBUTION, in architecture, the dividing and diſpenſing the ſeveral parts and pieces which compoſe a building, as the plan directs.

DISTRIBUTION, in logic, is a kind of diviſion which diſtinguiſhes an univerſal whole into its ſeveral kinds of ſpecies; as diviſion is to diſtinguiſh an integral whole into its ſeveral parts.

DISTRIBUTION, in rhetoric, a kind of deſcription, whereby an orderly diviſion and enumeration is made of the principal qualities of the ſubject.

DISTRIBUTION, in printing, the taking a form aſunder, ſeparating the letters, and diſpoſing them in the caſes again, each in its proper cell. See PRINTING.

DISTRIBUTIVE JUSTICE is that whereby we give every perſon what properly belongs to him.

DISTRICT, in geography, a part of a province, diſtinguiſhed by peculiar magiſtrates, or certain privileges; in which ſenſe it is ſynonimous with hundred. See the article HUNDRED.

DITCH, in country affairs, a narrow channel or trench made for draining in marſhy grounds, the conveyance of water, or incloſing fields.

Ditches for draining muſt be more or leſs deep and wide, according as there is more or leſs water to be carried off. Ditches uſed about incloſures are five or ſix feet wide, and proportionably deep, where there is no quick-ſet hedges; but where theſe are ſet on the banks, they are only three feet wide at the top, one at the bottom, and two deep: the ſlope is of great advantage, as by means of it the ſides of the ditch are prevented from being waſhed down. See DRAIN and INCLOSURE.

DITCH, in fortification, the ſame with moat. See the article MOAT.

DITHYRAMBIC, ſomething belonging to the dithyrambus, as a dithyrambic verſe, a dithyrambic poet, &c.

The dithyrambic poetry was very bold and irregular, for the poets not only took the liberty to forge new words for the purpoſe, but made double and compound words, which contributed very much to the magnificence of this ſort of poetry.

DITHYRAMBUS, in ancient poetry, a hymn in honour of Bacchus, full of tranſport and poetical rage.

DITONE, in muſic, an interval comprehending two tones. The proportion of the ſounds that form the ditone is 4 : 5, and that of the ſemi-ditone is 5 : 6. F. Parran makes the ditone the fourth kind of ſimple concord, as comprehending two tones, according to Ariſtotle, a greater and a leſs. Others make it the firſt diſcord, dividing the ditone into eighteen equal parts, or commas; the nine on the acute ſide making the greater tone, as aſſerted by Salmon de Caux.

DITRIGLIPH, in architecture, the ſpace between two triglyphs. See TRIGLYPH.

DITTANY, *Dictamnus*, in botany, &c. See the article DICTAMNUS.

DITTO, uſually written D°. in books of accounts, an Italian word, ſignifying the aforementioned.

DIVALIA, the ſame with angeronalia. See the article ANGERONALIA.

DIVAN, a council-chamber, or court of juſtice, among the eaſtern nations, particularly the Turks.

DIVAN-BEGHI, the ſuperintendant of juſtice in Perſia, whoſe place is the laſt of the ſix miniſters of the ſecond rank, who are all under the athemadaulet, or firſt miniſter.

DIVERGENT, or DIVERGING LINES, in geometry, are thoſe which conſtantly recede from each other.

DIVERGENT RAYS, in optics, are thoſe which, going from a point of the viſible object, are diſperſed, and continually depart one from another, in proportion as they are removed from the object: in which ſenſe it is oppoſed to convergent. See the article CONVERGENT.

Concave glaſſes render the rays divergent, and convex ones convergent.

Concave mirrors make the rays converge, and convex ones make them diverge. See CONCAVE and CONVEX.

DIVERGENT, or DIVERGING HYPERBOLA, one whoſe legs turn their convexities towards one another, and run outwards quite contrary ways. See HYPERBOLA.

DIVERGING SERIES. See SERIES.

Point of DIVERGENCY. See the article VIRTUAL FOCUS.

DIVERSIFYING, among orators, is the handling a ſubject different ways, in order to throw new light on it, and enforce it the ſtronger on the hearers.

DIVERSION, in military affairs, is when an enemy is attacked in one place where they are weak and unprovided, in order to draw off their forces from making an irruption ſomewhere elſe. Thus the Romans gave a diverſion to Hannibal from Italy, by their attacking Carthage.

DIVERSION, in phyſic, is when by means of medicines an attempt is made to give a different turn to the flux of humours; thus blood-letting makes a great diverſion.

DIVIDEND, in arithmetic, is the number propoſed to be divided into a certain number of equal parts.

DIVINATION is the knowledge of things obſcure or future, which cannot be attained by any natural means.

The word is derived from the Latin, *divino*, to divine or foretel.

DIVING, the art or act of deſcending under water to conſiderable depths, and abiding there a competent time; the uſes of which are particularly in fiſhing for pearls, corals, ſponges, wrecks of ſhips, &c.

There have been various engines contrived to render the buſineſs of diving ſafe and eaſy; the great point is to furniſh the diver with freſh air, without which he muſt either make but a ſhort ſtay, or periſh. Thoſe who dive for ſponges in the Mediterranean, carry down ſponges dipped in oil in their mouths. But conſidering the ſmall quantity of air that can be contained in the pores of a ſponge, and how much that little will be contracted by the preſſure of the incumbent air, ſuch a ſupply cannot ſubſiſt a diver long, ſince a gallon of air is not fit for reſpiration above a minute. Dr. Halley aſſures us, a naked diver cannot ſubſiſt above two minutes under water, with or without a ſponge: beſides, if the depth be conſiderable, the preſſure of the water makes the eyes blood-ſhot, and frequently occaſions a ſpitting of blood. One Drebell, in the reign of James I. invented a machine to be rowed under water, carrying twelve rowers, beſides paſſengers, and a liquor to be carried in the veſſel, which ſupplied the place of freſh air.

Diving-Bell is a machine contrived for the ſafe conveyance of a diver to any reaſonable depth, and where he may ſtay more or leſs time under water, as the bell is greater or leſs.

That the reader may have a juſt idea of the campana urinatoria, or diving-bell, according to the lateſt improvements by Dr. Halley and Mr. Triewald of Stockholm, we have exhibited two figures of the ſame. The firſt (plate LIV. *fig.* 3.) is that of Dr. Halley's form, which was three feet wide at top, five feet at bottom, and eight feet high; and contained about ſixty-three cubic feet, or near eight hogſheads, in its concavity.

This was coated with lead, ſo heavy that it would ſink empty; and the weight was diſtributed about the bottom I K, ſo that it would go down in a perpendicular poſition, and no other. In the top was fixed a ſtrong but clear glaſs D, to let in the light from above; and likewiſe a cock, as at B, to let out the hot air that had been breathed; and below, as L M, was fixed a circular ſeat for the divers to ſit; and laſtly, from the bottom was hung by three ropes a ſtage for the divers to ſtand upon to do their buſineſs. This machine was ſuſpended from the maſt of a ſhip by a ſprit, which was ſufficiently ſecured by ſtays to the maſt-head, and was directed by braces to carry it over-board clear of the ſide of the ſhip, and to bring it in again.

To ſupply the bell with air under water, two barrels, ſuch as C, of about ſixty-three gallons each, were made and caſed with lead, ſo that they would ſink empty, each having a hole in its loweſt part to let in the water, as the air in them is condenſed in their deſcent, and to let it out again, when they were drawn up full from below: and to a hole in the top of the barrels is fixed a hoſe, or hollow pipe, well prepared with bees-wax and oil, which was long enough to fall below the hole at the bottom, being ſunk with a weight; ſo that the air in the upper-part of the barrels could not eſcape, unleſs the lower ends of theſe pipes were firſt lifted up.

The air-barrels were fitted with tackle, proper to make them riſe and fall alternately, like two buckets in a well. In their deſcent, they were directed by lines faſtened at the under edge of the bell to the man ſtanding on the ſtage to receive them, who by taking up the ends of the pipes above the ſurface of the water in the bell, gave occaſion for the water in the barrels to force all the air in the upper-parts into the bell, while it entered below, and filled the barrels: and as ſoon as one was diſcharged by a ſignal given, it was drawn up and the other deſcended, to be ready for uſe.

As the cold air ruſhed into the bell from the barrel below, it expelled the hot air, which was lighter, through the cock B, at the top of the bell, which was then opened for that purpoſe. By this method air is communicated ſo quick, and in ſuch plenty, that the doctor tells us, he himſelf was one of five who were at the bottom, in nine or ten fathoms water, for above an hour and an half at a time, without any kind of ill conſequence; and he might have continued there as long as he pleaſed, for any thing that appeared to the contrary.

In going down, it is neceſſary it ſhould be very gently at firſt, that the denſe air may be inſpired to keep up, by its ſpring, a balance to the preſſure of the air in the bell. Upon each twelve feet deſcent, the bell is ſtopped, and the water that enters it is driven out by letting in three or four barrels of freſh air. By this means the doctor ſays, he could, by taking off the ſtage, lay the bottom of the ſea, juſt within the compaſs of the bell, ſo far dry as not to be over ſhoes thereon.

By the glaſs above ſo much light was tranſmitted when the ſun ſhone, and the ſea was clear and ſmooth, that he could ſee perfectly well to write and read, and much more to take up any thing under the bell; and by the return of the air-barrels, he could ſend up orders, written with an iron-pen, on ſmall pieces of lead, directing how they were to be moved from place to place.

But in dark weather, when the ſea was ro
bled, it would be as dark as night in the
the doctor found he could keep a candle b
bell as long as he pleaſed; it being found b
that one candle conſumes much about the
of confined air as one man does, viz. abou
minute.

The only inconvenience the doctor compl
that upon firſt going down they felt a ſmall
ears, as if the end of a quill were forcibly t
hole of the ear. This may proceed from i
time before the air can get from the mouth.
ſmall canal of the Euſtachian tube, which
inner cavity of the ear; where, when it cor
an equilibrium with the outward air, preſſin
panum, and thus the pain, for a ſhort time,
deſcending lower, the pain of the ears re
again abated; and ſo on till you come dow
tom, where the air is of the ſame denſity co

One of thoſe divers, in order to prevent
a piece of chewed paper in his ears, which, a
ſcended, was ſo forcibly preſſed into the ca
was with great difficulty the ſurgeon coul
Thus a bottle, with only common air in it
down tight, if it be let down to a conſidera
water, will be found, upon drawing it up ag
the cork forced in by the preſſure of the v
depth.

This bell was ſo far improved by the doc
could detach one of his divers to the diſtan
or an hundred yards from it, by a contrivan
or head piece, ſomewhat like an inverted har
at F, with a glaſs in the fore-part, for hin
way through; this cap was of lead, and
quite cloſe about his ſhoulders; in the top of
a flexible pipe communicating with the bell, a
he had air, when he wanted, by turning th
near his head-piece. There was alſo anot
the end in the bell, to prevent any accident
from the perſon without.

This perſon was always well cloathed
flannels, which were warmed upon him, be
the bell, and would not ſuffer the cold water
to hurt him; his cap contained air enough t
a minute or two; then by raiſing himſelf abo
and turning the cock F, he could repleniſh
This pipe he coiled round his arm, which ſe
a clue to find his way to the bell again.

This diving-bell received its laſt improve
Mr. Martin Triewald, F. R. S. captain of mec
military architecture to his Swediſh majeſty;
and form whereof is ſhewn in *fig.* 4. which
of his own drawing. A, B, is the bell, which,
by the ſcale of feet under it, is much leſ
Halley's, and therefore will come cheaper.
with leaden weights D, D, appended at the bo
ſubſtance of the bell is copper, and tinned withi
and as in the rivers and coaſts of the *Baltic* ſea,
is very clear, ſo he has illuminated the bell
ſtrong convex lenſes G, G, G, with copper lid
to defend them.

The iron-ring, or plate E, ſerves the dive
upon, when he is at work; and is ſuſpended
diſtance from the bottom of the bell, that whe
ſtands upright, his head is juſt above the wa
bell; and it is much better there than higher
bell, becauſe the air is colder, and conſeque
freſh and fit for reſpiration near the ſurface of
than towards the top of the bell.

But when there is occaſion for the diver to
in the bell, and his head of courſe in the upper-
Triewald has contrived, that even there, whe
breathed the hot air as long as he well can, by m
ſpiral copper-tube *b*, *c*, placed cloſe to the inſi
bell, he may then draw the cooler and freſher
the lowermoſt parts; to which end, a flexibl
tube, about two feet long, is fixed to the upp
the tube at *b*, to the other end of which is
ivory mouth-piece, for the diver to hold in h
to reſpire the air from below by; and this

PLATE LIV.

Facing Diving Bell.

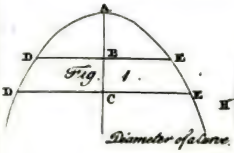


Fig. 1.

Diameter of a Cone.

Dipping Needle.

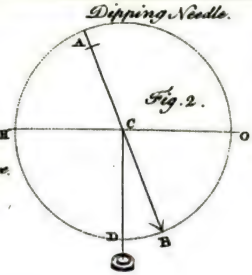


Fig. 2.

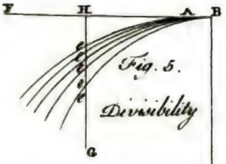

F
H
A
B
e
e
e
e
e
G
C
C
C
C
C
D

Fig. 5.

Divisibility

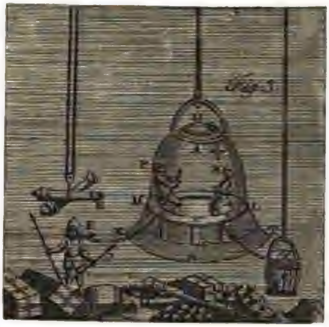


Fig. 3.

Diving Bell.

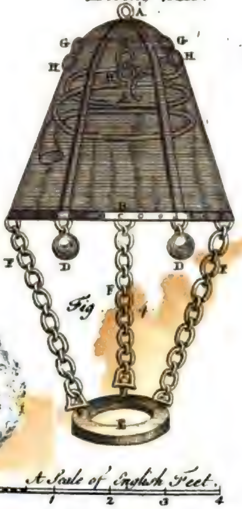

A
G
G
H
H
B
B
C
D
D
F
F
F
E
A Scale of English Feet.
1
2
3
4

Fig. 4.

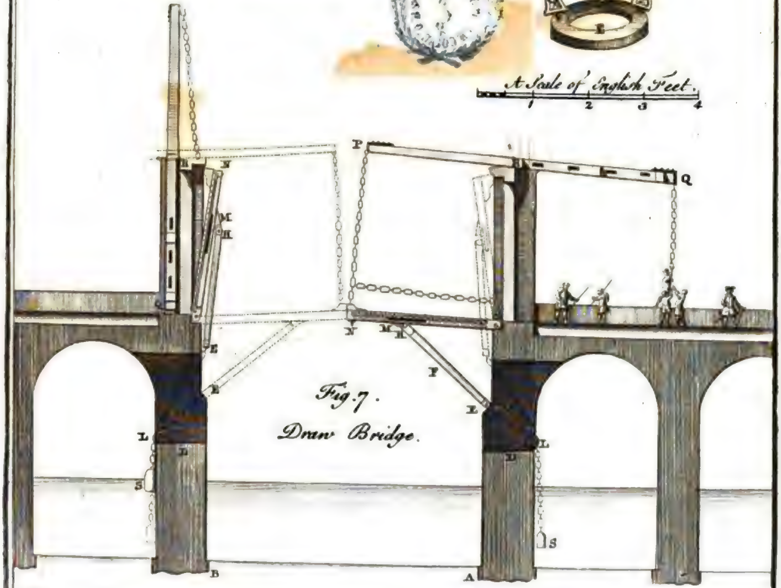

P
Q
B
N
M
H
E
F
L
D
S
B
N
M
H
F
E
L
D
S
A

Fig. 7.

Draw Bridge.

do in any poſture of ſtanding, ſitting, bowing his body, &c.

Diving-Bladder, a term uſed by Borelli for a machine which he contrived for diving under water to great depths, with great facility, and prefers to the common diving-bell. The veſica, or bladder, as it is uſually called, is to be of braſs or copper, and about two feet in diameter. This is to contain the diver's head, and is to be fixed to a goat's ſkin habit, exactly fitted to the ſhape of the body of the perſon. Within this veſica there are pipes, by means of which a circulation of air is contrived; and the perſon carries an air-pump by his ſide, by means of which he may make himſelf heavier or lighter, as the fiſhes do by contracting or dilating their air-bladder: by this means the objections all other diving machines are liable to, are obviated, and particularly that of the air; the moiſture by which it is clogged in reſpiration, and by which it is rendered unfit for the ſame uſe again, being here taken from it by its circulation through the pipes, to the ſides of which it adheres, and leaves the air as free as before. *Borelli Opera Poſthuma.*

DIVISIBILITY, in philoſophy, that diſpoſition of a body, whereby it is conceived to have parts, into which it may actually or mentally be divided.

That body is extended is ſelf-evident, it being impoſſible to conceive any body which has not length, breadth, and thickneſs, that is, extenſion.

It is no leſs evident, that body is diviſible; for, ſince no two particles of matter can exiſt in the ſame place, it follows that they are diſtinct from each other, which is all that is meant by being diviſible.

In this ſenſe the leaſt conceivable particle muſt ſtill be diviſible, ſince it will conſiſt of parts, which will be really diſtinct. To illuſtrate this by a familiar inſtance: let the leaſt imaginable piece of matter be conceived lying on a plane ſmooth ſurface, it is evident the ſurface will not touch it every where; thoſe parts therefore, which it does not touch, may be ſuppoſed ſeparable from the other, and ſo on as far as we pleaſe; and this is all that is meant, when we ſay matter is infinitely diviſible.

This propoſition is demonſtrated geometrically thus: Suppoſe the line AD (pl. LIV. *fig.* 5.) perpendicular to BF, and another at G H, at a ſmall diſtance from it, alſo perpendicular to the ſame line; from the centers C, C, C, &c. deſcribe circles cutting the line G H in the points *e*, *e*, *e*, &c. Now the greater the radius A C is, the leſs is the part *e* H: but the radius may be augmented in infinitum. So long therefore the part *e* H may be divided into ſtill leſs portions; conſequently it may be divided in infinitum. Q. E. D.

How far matter may actually be divided, may in ſome manner be conceived from hence, that a piece of wire, gilt with ſo ſmall a quantity as eight grains of gold, may be drawn out to a length of 13000 feet, the whole ſurface of it ſtill remaining covered with gold.

We have a ſurpriſing inſtance of the minuteneſs of ſome parts of matter, from the nature of light and viſion. Let a candle be lighted and placed in an open plain, it will then be viſible two miles round; conſequently, was it placed two miles above the ſurface of the earth, it would fill with luminous particles a ſphere, whoſe diameter was four miles, and that before it had loſt any ſenſible part of its weight.

A quantity of vitriol, being diſſolved and mixed with 9000 times as much water, will tinge the whole; conſequently the vitriol will be divided into as many parts as there are viſible portions of matter in that quantity of water.

Dr. Keil hath computed the magnitude of a particle of aſſa-fœtida to be [illegible] parts of a cubic inch.

He has likewiſe ſhewn that one of thoſe globules of blood, which circulate in the veins of ſome very ſmall creatures, doth not exceed the [illegible] parts of a cubic inch.

Once more, he hath alſo demonſtrated that one grain of ſand will contain 125000000000000000000000000 of the aforeſaid blood-globules; that is, 10256 times more than the higheſt mountain upon earth contains grains of ſand.

DIVISION, in general, is the ſeparating a thing into two or more parts.

Division, in arithmetic, is the finding ſuch a number or quantity, from two given numbers or quantities, that it ſhall bear the ſame proportion to one of the given quantities or numbers, as unity does to the other.

Diviſion of numbers is only a compendious ſubtraction; that is, it ſpeedily diſcovers how often one number is contained in another; and to perform this, two numbers are required to be given.

Diviſion is performed in numbers, by ſeeking how many times the diviſor is contained in the dividend, and as often ſubtracting, and writing ſo many units in the quotient; and by repeating that operation upon occaſion, as often as the diviſor can be ſubtracted.

Thus, to divide 63 by 7, ſeek how many times 7 is contained in 63, and there will come out preciſely 9 for the quotient; and conſequently $\frac{63}{7}$ is equal to 9. Moreover, to divide 371 by 7, prefix the diviſor 7, and beginning at the firſt figures of the dividend, coming as near them as poſſible, ſay, how many times 7 is contained in 37, and you will find 5; then writing 5 in the quotient, ſubtract 5 × 7, or 35 from 37, and there will remain 2, to which ſet the laſt figure of the dividend, viz. 1, and then 21 will be the remaining part of the dividend for the next operation; ſay therefore as before, how many times 7 is contained in 21, and the anſwer will be 3; wherefore writing 3 in the quotient, take 3 × 7, or 21, from 21, and there will remain 0. Whence it is manifeſt, that 53 is preciſely the number that ariſes from the diviſion of 371 by 7.

```
7) 371 (53
   35
    21
    21
    .0
```

And thus to divide 4798 by 23; firſt beginning with the initial figures 47, ſay, how many times is 23 contained in 47, anſwer 2; wherefore write 2 in the quotient, and from 47 ſubtract 4 × 23, or 46, and there will remain 1, to which join the next number of the dividend, viz. 9, and you will have 19 to work upon next. Say, therefore, how many times is 23 contained in 19, anſwer 0; wherefore write 0 in the quotient; and from 19 ſubtract 0 × 23, or 0, and there remains 19, to which join the laſt number 8, and you will have 198 to work upon next; wherefore in the laſt place ſay, how many times is 23 contained in 198, (which may be gueſſed at from the firſt figures of each, 2 and 19, by taking notice how many times 2 is contained in 19) I anſwer 8; wherefore write 8 in the quotient, and from 198 ſubtract 8 × 23, or 184, and there will remain 14 to be farther divided by 23; and ſo the quotient will be $208\frac{14}{23}$. And if this fraction is to be avoided, you muſt continue the diviſion in decimal fractions, by adding always a cypher to the remaining number. Thus to the remainder 14 add 0, and it becomes 140: then ſay, how many times 23 in 140, anſwer 6; write therefore 6 in the quotient; and from 140 ſubtract 6 × 23, or 138, and there will remain 2; to which ſet a cypher (or 0) as before; and thus the work being continued at pleaſure, there will at length ariſe this quotient, viz. 208,6086.

```
23) 4798 (208,6086, &c.
    46
     19
     00
     198
     184
      140
      138
       20
       00
       200
       184
        160
```

After the ſame manner the decimal fraction 3.5218 is divided by the decimal fraction 46.1, and there comes out 0.07639, &c. Where note, that there muſt be ſo many figures cut off in the quotient, for decimals, as there are more in the laſt dividend than in the diviſor; as in this example, 5, becauſe there are 6 in the laſt dividend, 0.004370, and 1 in the diviſor 46.1.

```
46.1) 35218 (0.07639
       3227
        2948
        2766
        .1820
         1383
          4370
```

In algebraic terms diviſion is performed by the reſolution of what is compounded by multiplication. Thus, ab divided by a gives for the quotient b; $6ab$ divided by $2a$ gives $3b$; and divided by $-2a$ gives $-3b$; $-6ab$ divided by $2a$ gives $-3b$; and divided by $-2a$ gives $3b$, $16abc^3$, divided by $2ac$ gives $8bcc$; $-84a^3x^4$ divided by $-12aaxx$ gives $7axx$. Likewiſe [illegible] divided by $\frac{2}{5}$ gives $\frac{3}{7}$; $\frac{aa}{bd}$ divided by $\frac{a}{b}$ gives $\frac{a}{d}$; $\frac{-21accy^3}{8b^5}$ divided by $\frac{3acy}{2bb}$ gives $\frac{-7cyy}{4b^3}$; $\frac{6}{5}$ divided by 3 gives $\frac{2}{5}$; and reciprocally $\frac{6}{5}$ divided by $\frac{2}{5}$ gives $\frac{3}{1}$, or 3; $\frac{30a^3z}{c^2}$ divided by $2a$ gives $\frac{15aaz}{cc}$; and reciprocally divided by $\frac{15aaz}{cc}$ gives $2a$. Likewiſe $\sqrt{15}$ divided by $\sqrt{3}$ gives $\sqrt{5}$. $\sqrt{abcd}$ divided by $\sqrt{cd}$ gives $\sqrt{ab}$. $\sqrt{a^3c}$ by $\sqrt{ac}$ gives $\sqrt{aa}$, or a. $\frac{12ddx\sqrt{5abcx}}{70aee}$ divided by $\frac{-3dd\sqrt{5cx}}{10ee}$ gives $\frac{-4x\sqrt{ab}}{7a}$. And ſo $\overline{a+b}\sqrt{ax}$ divided by $a+b$ gives $\sqrt{ax}$; and reciprocally divided by $\sqrt{ax}$ gives $a+b$. And $\frac{a}{a+b}\sqrt{ax}$ divided by $\frac{1}{a+b}$ gives $a\sqrt{ax}$, or divided by a gives $\frac{1}{a+b}\sqrt{ax}$, or $\frac{\sqrt{ax}}{a+b}$; and reciprocally divided by $\frac{\sqrt{ax}}{a+b}$ gives a. But in diviſions of this ſort you are to take care, that the quantities divided by one another be of the ſame kind, viz. that numbers be divided by numbers, and ſpecies by ſpecies, radical quantities by radical quantities, numerators of fractions by numerators, and denominators by denominators; alſo in numerators, denominators, and radical quantities, the quantities of each kind muſt be divided by homogeneous ones, or quantities of the ſame kind.

Now if the quantities to be divided cannot be thus reſolved by the diviſor propoſed, it is ſufficient, when both the quantities are integers, to write the diviſor underneath, with a line between them. Thus to divide ab by c, write $\frac{ab}{c}$; and to divide $\overline{a+b}\sqrt{cx}$ by a, write $\frac{\overline{a+b}\sqrt{cx}}{a}$ or $\frac{a+b}{a}\sqrt{cx}$. And ſo $\sqrt{aa+ab}\times\sqrt{aa-2xx}$ divided by $\overline{a-b}\sqrt{aa-xx}$ gives $\frac{aa+ab}{a-b}\sqrt{\frac{ax-2xx}{aa-xx}}$. And $12\sqrt{5}$, divided by $4\sqrt{7}$ gives $3\sqrt{\frac{5}{7}}$.

But when theſe quantities are fractions, multiply the numerator of the dividend into the denominator of the diviſor, and the denominator into the numerator, and the firſt product will be the numerator, and the latter the denominator of the quotient.

Thus to divide $\frac{a}{b}$ by $\frac{c}{d}$ write $\frac{ad}{bc}$; that is, multiply a by d, and b by c. In like manner $\frac{3}{7}$ by $\frac{5}{4}$ gives $\frac{12}{35}$, and $\frac{3a}{4c}\sqrt{ax}$ divided by $\frac{2c}{5a}$ gives $\frac{15aa}{8cc}\sqrt{ax}$, and divided by $\frac{2c\sqrt{aa-xx}}{5a\sqrt{ax}}$ gives $\frac{15a^3x}{8cc\sqrt{aa-xx}}$. After the ſame manner, $\frac{ad}{b}$ divided by c (or by $\frac{c}{1}$) gives $\frac{ad}{bc}$. And c (or $\frac{c}{1}$) divided by $\frac{ad}{b}$ gives $\frac{bc}{ad}$. Alſo $\frac{a+b}{c}\sqrt{cx}$ divided by a gives $\frac{a+b}{ac}\sqrt{cx}$. And $\overline{a+b}\sqrt{cx}$ divided by $\frac{a}{c}$ gives $\frac{ac+bc}{a}\sqrt{cx}$. And $2\sqrt{\frac{axx}{c}}$ divided by $3\sqrt{cd}$ gives $\frac{2}{3}\sqrt{\frac{axx}{ccd}}$; and divided by $3\sqrt{\frac{cd}{x}}$ gives $\frac{2}{3}\sqrt{\frac{ax^3}{ccd}}$. $\frac{1}{2}\sqrt{\frac{7}{11}}$ divided by $\frac{1}{2}\sqrt{\frac{3}{7}}$ gives $\sqrt{\frac{49}{33}}$ or $\frac{7}{\sqrt{33}}$, and ſo in others.

A quantity compounded of ſeveral terms is divided by dividing each of its terms by the diviſor. Thus $aa+3ax-xx$ divided by a gives $a+3x-\frac{xx}{a}$. But when the diviſor conſiſts alſo of ſeveral terms, the diviſion is performed as in numbers. Thus, to divide $a^3+2aac-aab-3abc+bbc$ by $a-b$, ſay, how many times is a contained in a^3, viz. the firſt term of the diviſor in the firſt term of the dividend; anſwer aa. Wherefore write aa in the quotient, and having ſubtracted $a-b$ multiplied into aa, or a^3-a^2b from the dividend, there will remain $2aac-3abc+bbc$ yet to be divided: then ſay again, how many times a in $2aac$, anſwer $2ac$: wherefore write alſo $2ac$ in the quotient, and having ſubtracted $a-b$ into $2ac$, or $2aac-2abc$ from the aforeſaid remainder, there will yet remain $-aabbc+bc$: wherefore ſay again, how many times a in $-abc$, anſwer $-bc$, and then write $-bc$ in the quotient; and having, in the laſt place, ſubtracted $+a-b$ into $-bc$, viz. $-abc+bbc$ from the laſt remainder, there will remain nothing; which ſhews that the diviſion is at an end, and the quotient coming out $aa+2ac-bc$.

But that theſe operations may be duly reduced to the form which we uſe in the diviſion of numbers, the terms both of the dividend and the diviſor muſt be diſpoſed in order, according to the dimenſions of that letter which is judged moſt proper for the operation; ſo that thoſe terms may ſtand firſt, in which that letter is of moſt dimenſions, and thoſe in the ſecond place whoſe dimenſions are next higheſt, and ſo on to thoſe wherein that letter is not at all involved, or into which it is not at all multiplied, which ought to ſtand in the laſt place. Thus in the example we juſt now brought, if the terms are diſpoſed according to the dimenſions of the letter a, the following diagram will ſhew the form of the work, viz.

$$\begin{array}{rl}
a-b) & \underline{a^3\begin{smallmatrix}+2aac\\-aab\end{smallmatrix}-3abc+bbc}\ (aa+2ac-bc \\
 & \underline{a^3-aab} \\
 & 0+2aac-3abc \\
 & \underline{\quad 2aac-2abc} \\
 & \qquad 0-abc+bbc \\
 & \qquad\underline{\ \ -abc+bbc} \\
 & \qquad\quad 0 \qquad 0
\end{array}$$

Where may be ſeen, that the term a^3, or a of three dimenſions, ſtands in the firſt place of the dividend, and the terms $\begin{smallmatrix}2aac\\-aab\end{smallmatrix}$, in which a is of two dimenſions, ſtand in the ſecond place, and ſo on. The dividend might alſo have been writ thus:

$$a^3\begin{smallmatrix}+2c\\-b\end{smallmatrix}aa-3bca+bbc$$

Where the terms that ſtand in the ſecond place are united by collecting together the factors of the letter, according to which the order is made. And thus, if the terms were to be diſpoſed according to the dimenſions of the letter b, the buſineſs muſt be performed as in the following diagram, the explication whereof we ſhall here ſubjoin.

$$\begin{array}{rl}
-b+a) & \underline{cbb\begin{smallmatrix}-3ac\\-aa\end{smallmatrix}b\begin{smallmatrix}+a^3\\+2aac\end{smallmatrix}}\Big(-cb\begin{smallmatrix}+2ac\\+aa\end{smallmatrix} \\
 & \underline{cbb-acb} \\
 & \quad 0\begin{smallmatrix}-2ac\\-aa\end{smallmatrix}b\begin{smallmatrix}+a^3\\+2aac\end{smallmatrix} \\
 & \quad\ \underline{\begin{smallmatrix}-2ac\\-aa\end{smallmatrix}b\begin{smallmatrix}+2aac\\+a^3\end{smallmatrix}} \\
 & \qquad\ 0 \qquad 0
\end{array}$$

Say, how many times is $-b$ contained in cbb, anſwer $-cb$: wherefore, having writ $-cb$ in the quotient, ſubtract $+\overline{a-b}\times-cb$, or $bbc-abc$, and there will remain in the ſecond place $\begin{smallmatrix}-2ac\\-aa\end{smallmatrix}b$. To this remainder add, if you pleaſe, the quantities that ſtand in the laſt place, viz. $\begin{smallmatrix}a^3\\2aac\end{smallmatrix}$; and ſay again, how many times is $-b$ contained in $\begin{smallmatrix}-2ac\\-aa\end{smallmatrix}b$, anſwer $\begin{smallmatrix}+2ac\\+aa\end{smallmatrix}$. Theſe therefore being writ in the quotient, ſubtract $-b+a$, multiplied by $\begin{smallmatrix}+2ac\\+aa\end{smallmatrix}$ or $\begin{smallmatrix}-2ac\\-aa\end{smallmatrix}b+\begin{smallmatrix}2aac\\+a^3\end{smallmatrix}$, and there will remain nothing. Whence it is manifeſt, that the diviſion is at an end, the quotient coming out $-cb+2ac+aa$, as before.

Division, among logicians, is the explication of a complex idea, by enumerating the ſimple ideas of which it is compoſed; in which ſenſe it is nearly allied to definition, only that this laſt regards names and things, whereas diviſion is employed wholly about ideas.

When the parts of an idea are divided, in order to a clearer explication of the whole, this is called a ſubdiviſion: thus, a year is divided into twelve months, a month is ſubdivided into weeks, weeks into days, days into hours, and ſo on.

The rules for a good diviſion are theſe, that the members entirely exhauſt the whole; that they be oppoſite; that ſubdiviſions be not too numerous; that the whole be firſt divided into its larger parts, and theſe into the more remote and minute parts.

Division, in muſic, the dividing the interval of an octave into a number of leſs intervals. See Octave.

Division *of a Battalion*, are the ſeveral parcels into which a battalion is divided in marching. The lieutenants and enſigns march before the diviſions.

Division, in a naval armament, is a certain number of ſhips in a fleet or ſquadron, diſtinguiſhed by a particular flag or pendant, and commanded by a particular officer.

When a fleet conſiſts of ſixty ſail of the line, (i. e. ſhips of or above 60 guns) the admiral divides it into three ſquadrons, each of which has its diviſions, and three general officers, viz admiral, vice-admiral, and rear admiral. Each ſquadron has its proper colours, and each diviſion its proper maſt; for example, the white flag is proper for the firſt ſquadron of France; the white and blue for the ſecond; and the blue for the third. In England, the firſt admiral of the fleet carries the union-flag at the main-top maſt-head; next the admiral of the white; and then the admiral of the blue. The particular ſhips carry pendants of the ſame colour of their ſquadrons, at the maſts of their reſpective diviſions; ſo that the laſt ſhip in the diviſion of the blue ſquadron, wears a blue pendant at the mizen-top maſt-head.

The general officers, or commanders of diviſions, place themſelves in the center of their diviſions. We muſt except the three commanding admirals, who, in a ſailing poſition, lead their reſpective ſquadrons.

DIVISOR, in arithmetic, the number that divides another, called the dividend; or which ſhews into how many parts the dividend is to be divided. See the article Division.

DIVORCE, a breach or diſſolution of the bond of marriage. See Marriage.

DIURESIS, in medicine, an excretion of urine: whence,

DIURETICS, in pharmacy, ſuch ſimples as increaſe the diſcharge of urine; or which are ſuppoſed to have a power of removing obſtructions in the urinary paſſages. Diuretics muſt increaſe the liquor to be ſecreted in the proper glandules, and are of the five following kinds: the firſt contains all relaxing and emollient decoctions, emulſions, &c. which do not ſtimulate, but only remove obſtructions, by relaxing the veſſels. The ſecond comprehends all thoſe which diſſolve and dilute the blood. The third contains three kinds of medicines: 1. All acids which ſtimulate the veſſels. 2. All ſaline bodies. 3. All fixed and volatile ſalts. The fourth takes in all that preſerve a moderate heat of the body, without ſweat. The fifth claſs contains thoſe whoſe effects diſcover themſelves about the kidneys and bladder; alſo all acrid and ſolvent diuretics.

DIURNAL, in aſtronomy, ſomething relating to the day, in oppoſition to nocturnal, which regards the night.

Diurnal Arch, the arch or number of degrees that the ſun, moon, or ſtars, deſcribe between their riſing and ſetting.

Diurnal Circle. See Circle.

Diurnal *Motion of a Planet*, is ſo many degrees and minutes as any planet moves in twenty-four hours. Hence the motion of the earth about its axis, is called its diurnal motion. See Earth.

Diurnal is alſo uſed in ſpeaking of what belongs to the nyct-hemeron, or natural day of twenty-four hours, in oppoſition to annual, menſtrual, &c. The diurnal phœnomena of the heavenly bodies, ariſe from the motion of the earth round its axis.

DIZZINESS, in medicine, a diſeaſe of the head, called by phyſicians vertigo. See Vertigo.

DO, in muſic, a note of the Italian ſcale correſponding to ut of the common gamut. See Gamut.

DOCIMASIA, in Greek antiquity, a probation of the magiſtrates and perſons employed in public buſineſs at Athens. It was performed publicly in the forum, where they were obliged to give an account of themſelves and their paſt life before certain judges.

DOCK, *Lapathum*, in botany and medicine. See the article Lapathum.

Dock, or **Docking**, in law, an expedient for cutting off an eſtate-tail in lands or tenements, that the owner may be enabled to ſell, give, or bequeath the ſame

Dock, in the manege, called by the French trouſſequeue, is a large caſe of leather, as long as the dock of a horſe's tail, which covers the tails of leaping horſes.

Dock, in maritime affairs, a ſort of broad deep trench built by the ſide of a harbour, or on the banks of a river, commodiouſly fitted either for building ſhips, or receiving them to be repaired or cleaned in the bottom.

Theſe ſort of docks have generally ſtrong flood-gates to prevent the flux of the tide from entering the dock while the ſhip is under repair

There are likewiſe other ſort of docks, called wet docks, where a ſhip can only be cleaned during the time of the ebb-tide, or in the interval between the time which the tide left her dry on the ground, and the time it returns to her. Theſe ſort of docks have no flood-gates.

DOCKET, a little bill tied to wares or goods, directed to the perſon or place they are to be ſent to.

Docket, or **Dogget**, in law, ſignifies a brief in writing, made on a ſmall piece of paper, or parchment, containing the purport and effect of a large writing.

Docking *a Ship*, receiving her into the dock, cleaning the bottom with burning faggots, and daubing it over with a maſs of tallow, ſulphur, and other ingredients, to make it ſmooth, that it may the more ſwiftly glide through the water.

Dock-Yards, magazines containing all ſorts of naval ſtores; the principal ones in England, are thoſe at Chatham, Portſmouth, Plymouth, Woolwich, Deptford, and Sheerneſs. In time of peace ſhips of war are laid up in theſe places, where ſuch as want repairing are taken into the docks, examined, and refitted for ſervice.

Theſe yards are generally ſupplied from the northern crowns, with hemp, pitch, tar, roſin, and ſeveral other ſpecies: but as for maſts, particularly thoſe of the largeſt ſize, they are generally brought from New England

How much it imports the good of the public, to keep thoſe magazines conſtantly repleniſhed, every one is able to judge: and it were much to be wiſhed the improving the fore-mentioned commodities in our Britiſh plantations might meet with all poſſible encouragement, leſt one time or other it may prove difficult to get them elſewhere. It is reaſonable to think ſuch an undertaking will put the nation to conſiderable charge before it be brought to perfection; but when it can, many are the advantages that will ariſe from it.

DOCTOR, a perſon who has paſſed all the degrees of a faculty, and is impowered to teach or practiſe the ſame: thus we ſay, doctor in divinity, doctor in phyſic, doctor of laws.

Doctor *of the Church*, a title given to certain of the fathers, whoſe doctrines have been moſt generally received: of theſe are uſually reckoned four in the Greek church, viz. St. Athanaſius, St. Baſil, St. Gregory Nazianzen, and St. Chryſoſtom: and three in the Latin church, namely, St. Jerom, St. Auguſtine, and Gregory the Great.

DOCUMENT, in law, ſome written monument produced in proof of any thing aſſerted.

DODDER, the Engliſh name of a plant, called by authors cuſcuta. See the article Cuscuta.

DODECAGON, in geometry, a regular polygon, conſiſting of twelve equal ſides and angles.

Dodecagon, in fortification, is a place ſurrounded by twelve baſtions.

DODECAHEDRON is one of the platonic bodies, or five regular ſolids, and is contained under twelve equal and regular pentagons.

The ſolidity of a dodecahedron is found by multiplying the area of one of the pentagonal faces of it by 12; and then this latter product by $\frac{1}{3}$ of the diſtance of the face from the center of the dodecahedron, which is the ſame as the center of the circumſcribing ſphere.

The ſide of a dodecahedron inſcribed in a ſphere, is the greater part of the ſide of a cube inſcribed in that ſphere, cut into extreme and mean proportion.

If the diameter of the ſphere be 1.0000, the ſide of a dodecahedron inſcribed in it will be .35682 nearly.

All dodecahedrons are ſimilar, and are to one another as the cubes of the ſides; and their ſurfaces are alſo ſimilar, and therefore they are as the ſquares of their ſides; whence, as .509282 is to 10.51462, ſo is the ſquare of the ſide of any dodecahedron to the ſuperficies thereof, and as .3637 is to 2.78516, ſo is the cube of the ſide of any dodecahedron to the ſolidity of it.

DODECANDRIA, in the Linnæan ſyſtem of botany, a claſs of plants, the eleventh in order, comprehending all thoſe with hermaphrodite flowers, and only twelve ſtamina in each: ſuch are agrimony, aſarum, rhizophora, &c.

DODECATEMORY, an appellation given to the twelve ſigns of the zodiac, becauſe each of them contains a twelfth part of the whole. See SIGN.

DODECUPLA DI CROME, in the Italian muſic, a name given to the triple $\frac{12}{8}$, in four of which twelve notes are required, inſtead of four in common time.

DODECUPLA DI SEMI CROME, is our triple $\frac{12}{16}$, wherein there are twelve notes inſtead of ſixteen, in a bar of duple time.

DODONIAN, *Dodonæus*, in antiquity, an epithet given to Jupiter, becauſe he was worſhipped in a temple built in the foreſt of Dodona, where was the moſt famous, and it is ſaid the moſt ancient oracle of all Greece.

DODRANS, in antiquity, three fourths of the as. See the article AS.

DOG, *Canis*, in zoology, a genus of quadrupeds. See the article CANIS.

Bite of a mad DOG, in medicine. See the article HYDROPHOBIA.

DOG, *Canis*, in aſtronomy. See CANIS.

DOG's BANE, in botany, a genus of plants, the corolla of which conſiſts of a campanulated, roundiſh, ſingle petal, lightly divided into five ſegments, which are revolute: there is no other nectarium; the fruit is compoſed of oblong, acuminated follicles, each formed of two valves, and containing one cell; the ſeeds are numerous, very ſmall, and coronated with long down.

DOG-BERRY-TREE, a name ſometimes uſed for the cornel-tree. See CORNUS.

DOG-DAYS, the ſame with thoſe called canicular. See CANICULAR.

DOG-DRAW, a term in the foreſt-law, uſed when a man is found drawing after a deer, by the ſcent of a hound which he leads in his hand.

DOG's FENNEL, in botany, a name by which the cotula is ſometimes called. See COTULA.

DOG-FLY, a kind of fly, ſo called from its being particularly troubleſome to dogs: it is not unlike that ſpecies which infeſts cattle.

DOG's GRASS. See the article GRASS.

DOG's MERCURY, in botany, the name of a ſpecies of mercury. See MERCURY.

DOG's ROSE, a name ſometimes given to the common briar, or hip-buſh, a ſpecies of wild roſe. See the article ROSE.

DOG's STONES, a ſpecies of orchis, whence the ſalop made, ſaid to be a great provocative to venery.

DOG's TAIL, in botany, the ſame with the cynoſurus. See CYNOSURUS.

DOG's TONGUE, a plant called by botaniſts cynogloſſum. See the article CYNOGLOSSUM.

DOG's TOOTH, *Dens Canis*, a plant called by Linnæus, erythronium. See the article ERYTHRONIUM.

DOG's TOOTH SHELL, the ſame with the dentalium. See DENTALIUM.

DOG-WOOD, the ſame with the dog-berry-tree, above.

DOG-WOOD of Jamaica, the robina of botanical writers. See ROBINA.

DOG-WOOD of Virginia, a ſpecies of bay tree. See the article LAURUS.

DOGADO, a dutchy of Italy, of which Venice is the capital. See VENICE.

DOGE, the chief magiſtrate in the republic of Venice and Genoa.

This dignity is elective in both places: at Venice it continues for life, at Genoa it is only for two years. His title is ſerenity; he is chief of the council, and mouth of the republic.

DOGGER, in naval affairs, a Dutch fiſhing veſſel of the northern or German ocean: they are moſt commonly uſed in the herring-fiſhery, and are navigated with two maſts, viz. a main-maſt, and a ſmall mizen-maſt.

DOGGERS, in the alum-works, a poor kind of alum-ore. See ALUM.

DOGGS denote iron machines for burning wood on; alſo hooks fixed in large timbers for drawing them with horſes.

DOGMA, a principle, maxim, tenet, or ſettled opinion, particularly with regard to matters of faith and philoſophy.

DOGMATICAL, ſomething belonging to a doctrine or opinion. A dogmatical philoſopher is one who aſſerts things poſitively; in oppoſition to a ſceptic, who doubts of every thing.

DOGMATISTS, *Dogmatici*, a ſect of ancient phyſicians, of which Hippocrates was the firſt author. They are alſo called *logici*, logicians, from their uſing the rules of logic in ſubjects of their profeſſion. They laid down definitions and diviſions, reducing diſeaſes to certain genera, and thoſe genera to ſpecies, and furniſhing remedies for them all; ſuppoſing principles, drawing concluſions, and applying thoſe principles and concluſions to particular diſeaſes under conſideration; in which ſenſe the dogmatiſts ſtand contradiſtinguiſhed from empirics and methodiſts. They reject all medicinal virtues that they think not reducible to manifeſt qualities: but Galen hath long ago obſerved of ſuch men, that they muſt either deny plain matter of fact, or aſſign but very poor reaſons and cauſes of many effects they pretend to explain.

DOLE, in our ancient cuſtoms, ſignified a part, or portion, moſt commonly of a meadow, where ſeveral perſons have ſhares. It alſo ſtill ſignifies a diſtribution or dealing of alms, or a liberal gift made by a great man to the people.

DOLE, in the law of Scotland, is uſed for malevolent intention.

DOLG-BOTE, in our old writers, implies a recompence for a ſcar or wound.

DOLIUM, in natural hiſtory, the name of a ſimple ſhell, without any hinge, formed of one continuous piece, which makes a body of a figure approaching to round, diſtended, and, as it were, inflated.

Some of theſe have the mouth dentated; others ſmooth; in ſome the clavicle is moderately long, though in moſt it is depreſſed; and the columella is in ſome ſpecies ſmooth, in others wrinkled: theſe ſhells are found on the ſhores of many parts of the Eaſt-Indies, and are alſo frequently brought from America.

DOLLAR, a ſilver coin current in Spain, ſeveral parts of Germany, and Holland. There are various ſpecies of dollars, as the rix-dollar, the ſemi-dollar, the quarter-dollar, &c. for each of which ſee the article EXCHANGE.

DOLPHIN, in ichthyology, the Engliſh name of the delphinus, with an oblong rounded body, and a long acute roſtrum. It is conſiderably longer than the porpus: the opening of the mouth is vaſtly wide, reaching on each ſide to the breaſt; and the fiſtula, or aperture for diſcharging the water, is in the middle of its head.

DOLPHIN, *Delphinus*, in aſtronomy. See DELPHINUS.

DOLPHINS *of the Maſt*, in naval affairs, a ſort of flat wreath of platted cordage, to be faſtened occaſionally round the maſt as a ſupport to the puddening: the uſe of it is to prevent the yards of the main or fore-ſail from ſliding down on the maſt, when the ropes which held them up may have been ſhot away during the time of an engagement. See the article PUDDENING.

DOME, in architecture, a ſpherical roof, or a roof of a ſpherical form, raiſed over the middle of a building, as a church, hall, pavilion, veſtibule, ſtair-caſe, &c. by way of crowning.

Domes have commonly columns ranged around their outſides, both for the ſake of ornament and ſupport to the work.

DOMESDAY, or DOOMS DAY-BOOK, a very ancient record made in the time of William the Conqueror, which now remains in the exchequer, and conſiſts of two volumes, a greater and a leſs; the greater contains a ſurvey of all the lands in moſt of the counties in England, and the leſs comprehends ſome counties that were not then ſurveyed. The book of domeſday was begun by five juſtices, aſſigned for that purpoſe in each county, in the year 1081, and finiſhed in 1086. It was of that authority, that the Conqueror himſelf ſubmitted, in ſome caſes wherein he was concerned, to be determined by it. Camden calls this book the tax-book of king William; and it was farther called Magna Rolla.

There is likewiſe a third book of domeſday, made by command of the Conqueror; and alſo a fourth, being an abridgment of the other books.

DOMES-MEN, judges or perſons appointed to determine ſuits and controverſies between parties. See DAY's MAN.

DOMESTIC, any man who acts under another, ſerving to compoſe his family, in which he lives, or is ſuppoſed to live, as a chaplain, ſecretary, &c. Sometimes domeſtic is applied to the wife and children, but very ſeldom to ſervants, ſuch as footmen, porters, &c.

DOMESTIC NAVIGATION, coaſting, or ſailing along the ſhore, in which the lead and compaſs are the chief inſtruments.

DOMINATION, in theology, the fourth order of angels, or bleſſed ſpirits, in the hierarchy, reckoning from the ſeraphin.

DOMINI, or ANNO DOMINI. See the article ANNO.

DOMINICAL LETTER, in chronology, properly called Sunday-Letter, one of the ſeven letters of the alphabet ABCDEFG, uſed in almanacs, ephemerides, &c. to denote the Sundays throughout the year.

The word is formed from the Latin, *Dominica*, or *Dominicus dies*, Lord's day, Sunday.

The dominical letters were introduced into the calendar by the primitive Chriſtians, in lieu of the nundinal letters in the Roman calendar.

The firſt of theſe letters, which is A, is placed againſt the 1ſt of January; the ſecond, B, againſt the 2d of January; and ſo on to the ſeventh, G, which is placed againſt the 7th of January; after which the letter A is placed againſt the 8th, &c. to the end of the year. Hence it follows, that whatever letter happens to be placed againſt any day of any week, the ſame letter will point out that day throughout the year. Thus, if the firſt of January, againſt which the letter A is placed, happen to be a Monday, then will G be the Sunday-letter, and all the days in the calendar which have G put to them will be Sundays; and for the ſame reaſon the letter A will point out all the Mondays throughout that year. Now as a common year conſiſts of 365 days, or 52 weeks and one day over, it follows, that as the 1ſt, 8th, 15th, 22d, &c. day of the year have the ſame letter placed againſt it, the year will end on the ſame day of the week it commenced upon: and therefore, if the Sunday-letter in any aſſigned year (Leap-year excepted) be G, for the next it will be F, for the next following E, &c. in a retrograde order, until the 8th year, (ſuppoſing no Leap-year to intervene) in which the dominical letter will be G again, and will thus proceed in a retrogreſſive manner, the Sunday-letter returning in the 15th, 22d, 29th, &c. years. Hence it is very evident, that whatever letter was the dominical for the year 1, the ſame would have returned in the years 8, 15, 22, 29, &c. until this time (ſetting aſide the interpolation of Leap-years, and the reformation of the calendar).

Now as any term of the progreſſion 1, 8, 15, 22, &c. after the firſt, leſſened by unity, will exactly divide by 7, it follows, that if the propoſed year be divided by 7, the remainder will ſhew the order of the dominical letter for that year: thus, in 1737, the dominical letter was the ſame as in the year 1; and in 1740 it was three letters diſtant from it in a regreſſive order, that is, if the dominical letter for the year 1, was B, in the year 1737 it was B alſo, but in 1740 it was F.

But becauſe every fourth year conſiſts of 366 days; hence the above ſeries will be interrupted, and the order will not return till after twenty-eight years: for ſuppoſe G the Sunday-letter for the firſt after Leap-year, then the order of the letters for twenty-eight years next following will ſtand thus; G, F, E, $\overline{DC}$, B, A, G, $\overline{FE}$, D, C, B, $\overline{AG}$, F, E, D, $\overline{CB}$, A, G, F, $\overline{ED}$, C, B, A, $\overline{GF}$, E, D, C, $\overline{BA}$. Now as theſe letters proceed in the regular order, A, B, C, D, E, F, G, A, B, &c. it follows, that if the number of any propoſed year be increaſed by that of the Leap-years contained therein, the order of the letters according to the firſt ſeries will again be reſtored; therefore, let any propoſed year of our Lord be increaſed by its fourth part, (omitting fractions) and then the 1, 8, 15, 22d, &c. years will, as before, have the ſame dominical letter, and for the intermediate years, the remainder, after dividing by 7, will ſhew the order of the dominical letter according to that with which the computation firſt began.

In the Julian account the dominical letter correſponding to the reſpective years 1, 8, 15, &c. was aſſigned to the letter B; therefore, to find the Sunday letter for any given year agreeable to that method of computation, we muſt, after having encreaſed the number of the year by its fourth part, add 4 to the ſum before we divide by 7; becauſe, as there muſt remain 1 after having divided by 7, in order to have the ſame dominical letter as in the years 1, 8, 15, &c. and B being in the fifth place from G, (the radical Julian letter) reckoning towards A, it muſt certainly follow, that the dominical letter will, by theſe means, be removed four places farther from where it would otherwiſe have been.

Hence this rule for finding the Julian dominical letter: Add to the year its fourth part and 4, and divide that ſum by 7; if nothing remains, the dominical letter is G; but if there be any remainder, ſubtract it from 7, it leaves the index of the dominical letter required: reckoning for 1, A; for 2, B; for 3, C, &c.

Thus, if it were required to find the dominical letter for the year 1765, it will be B.

For the given year is	1765
To which add its fourth part	441
And — — —	4
The ſum is — —	2210

Which being divided by 7, the remainder will be 5, which taken from 7 leaves 2, the index of the letter B.

But by the reformation of the calendar under pope Gregory, the order of the dominical letters was interrupted in the Gregorian year: for the year 1582, which at the beginning had G for its dominical letter, by retrenching ten days after the fourth of October, came to have C for its dominical letter; and by having but one dominical letter for the year 1700, therefore the dominical letter of the ancient Julian calendar is four places before that of the Gregorian.—Whence, to find the dominical letter according to the Gregorian year, we muſt divide the ſum of the number of the year and its fourth part by 7, and ſubtract the remainder from 7, which will give the index of the dominical letter as before.

But becauſe the years 1800, 1900, 2100, 2200, &c. according to the Gregorian calendar, are of 365 days, and conſequently have each but one dominical letter, which according to the Julian would have two; therefore the courſe of the dominical letters will be changed, and conſequently this method of finding the dominical letter will only hold good until the end of the year 1799.

To find the dominical or Sunday letter, according to the calendar, until the year 1799 incluſive, add to the year of our Lord its fourth part, omitting fractions, and alſo the number 1; divide the ſum by 7; and if there is no remainder, then A is the Sunday letter: but if any number remains, then the letter ſtanding againſt that number in the ſmall annexed table, is the Sunday letter.

0	A
1	G
2	F
3	E
5	D
4	C
6	B

For the next century, that is, from the year 1800, till the year 1899 incluſive, add to the current year only its fourth part, and then divide by 7, and proceed as in the laſt rule.

Note, That in all Biſſextile, or Leap-years, the letter found as above will be the Sunday-letter from the intercalated day excluſive, to the end of the year.

DOMINICANS, an order of religious, called in France Jacobins, and in England Black Fryars, or Preaching Fryars. This order, founded by St. Dominic, a native of Spain, was approved of by Innocent III. in 1215, and confirmed by a bull of Honorius III. in 1216.

The deſign of their inſtitution was to preach the Goſpel, convert heretics, defend the faith, and propagate Chriſtianity. They embraced the rule of St. Auguſtine, to which they added ſtatutes and conſtitutions which had formerly been obſerved either by the Carthuſians or Præmonſtratenſes. The principal articles enjoined perpetual ſilence, abſtinence from fleſh at all times, wearing of woollen, rigorous poverty, and ſeveral other auſterities. This order has ſpread into all parts of the world. It has produced a great number of martyrs, confeſſors, and biſhops; and they reckon three popes, ſixty cardinals, one hundred and fifty archbiſhops, and eight hundred biſhops of their order, beſides the maſters of the ſacred palace, who have always been Dominicans. They are inquiſitors in many places.

The nuns or ſiſters of this order owe their foundation to St. Dominic himſelf, who built a monaſtery at Prouilles, where poor maids might be brought up, and ſupplied with all neceſſaries for their ſubſiſtence. The habit of theſe religious was a white robe, a tawney mantle, and a black veil. Their founder obliged them to work at certain hours of the day, and particularly to ſpin yarn and flax to make their own linen. The nuns of this order have one hundred and thirty houſes in Italy, forty-five in France, fifty in Spain, fifteen in Portugal, forty in Germany, and many in Poland, Ruſſia, and other countries. They lie on ſtraw beds, and never eat fleſh except in ſickneſs; but many monaſteries have mitigated this auſterity.

DOMINION, *Dominium*, in the civil law, ſignifies the power to uſe or diſpoſe of a thing as we pleaſe.

DOMINUS, in the civil law, he who poſſeſſes any thing by right of purchaſe, gift, loan, legacy, inheritance, payment, contract, or ſentence.

DOMINUS, in the feudal law, he who grants a part of his eſtate in fee to be enjoyed by another.

DONATION, an act whereby a perſon transfers to another, either the property or the uſe of ſomething, as a free gift. In order to be valid, it ſuppoſes a capacity both in the donor and donee; and requires conſent, acceptance, and delivery; and by the French law, alſo regiſtry. Civilians diſtinguiſh donation into pure and conditional. *Donatio pura* is when one gives a thing with an intention that it become immediately the property of the donee, never to revert to the donor; and this from no other motive than his generoſity. *Donatio conditionalis* is when one gives a thing with an intention that it become the property of the donee, upon performing ſome condition ſtipulated.

DONATISTS, Chriſtian ſchiſmatics in Africa, who took their name from their leader Donatus. A ſecret hatred againſt Cæcilian, elected biſhop of Carthage about the year 311, excited Donatus to form this ſect. He accuſed Cæcilian of having delivered up the ſacred books to the pagans, and pretended that his election was void, and all his adherents heretics. He taught that baptiſm adminiſtered by heretics was null; that every church but the African was become proſtituted; and that he was to be the reſtorer of religion. Some accuſe the Donatiſts of Arianiſm. Conſtantius and Honorius made laws for their baniſhment, and Theodoſius and Honorius condemned them to grievous mulcts.

DONATIVE, a gratuity, or preſent, made to any perſon.

DOOR, in architecture, an aperture in a wall to give entrance and exit into and out of a building, or any apartment thereof.

It is laid down as a rule, that the doors of an houſe be as few in number, and as moderate in dimenſions as poſſible; as all openings are weakenings.

Secondly, that they do not approach too near the angles of the walls, it being a very great ſoleciſm to weaken that part which ſtrengthens all the reſt.

Thirdly, that the doors, if poſſible, be placed over one another, that void may be over void, and full over full, which circumſtance will greatly ſtrengthen the whole fabric.

Fourthly, that if poſſible they may be oppoſite to each other, in ſuch a manner, that one may ſee from one end of the houſe to the other, which will not only be very graceful, but moſt convenient, in reſpect that it affords means of cooling the houſe in ſummer, by letting the air through it, and by keeping out the wind in winter, which way ſoever it ſit.

Fifthly, it is not only ornamental, but very ſecure, to turn arches over doors, which will diſcharge them in a great meaſure from the ſuperincumbent weight.

The proportions of doors are adjuſted by thoſe of a man. In large buildings, they muſt be always larger than in ſmaller; but ſhould not be leſs than ſix feet high in any to admit a man of a juſt ſtature erect: and as the breadth of a man, with his arms placed akembo, is nearly ſubduple his height, the width ought never to be leſs than three feet. Some architects give us theſe dimenſions following; in ſmall buildings, the breadth of the door four feet, or four and a half; in middling buildings five, or ſix; in large ones ſeven, or eight: in chambers of the firſt ſtory three and a half, three and three fourths, or four; of the ſecond, four, or four and a half; and of the third, five, or ſix; in churches ſeven or eight; in gates, nine, ten, or twelve: hence their height is eaſily determined, except for the gates of cities, which ſhould only be four-fifths of their breadth.

DORADO, in ichthyology, the ſame with guaracapema. See GUARACAPEMA.

DOREE, or JOHN DOREE, a fiſh, called by authors faber. See the article FABER.

DORIC, in general, any thing belonging to the Dorians, an ancient people of Greece, inhabiting near Mount Parnaſſus.

DORIC ORDER, in architecture, the ſecond of the five orders, being that between the Tuſcan and Ionic.

This order ſeems the moſt natural and beſt proportioned of all the orders, the ſeveral parts of it being founded on the natural poſition of ſolid bodies. Accordingly, the Doric is the firſt, and moſt ancient of the orders of architecture, and is that which gave the firſt idea or notion of regular building. See plate XLIII.

It was indeed more ſimple at its firſt invention, than it is at preſent; and when they came in after times to adorn and enrich it more, the appellation of Doric was reſtrained to this richer manner, and then they called the primitive, ſimple manner by the new name of Tuſcan.

Some time after its invention it was reduced to the proportions, ſtrength, and beauty of the body of a man: hence, as the foot of a man was judged the ſixth part of his height, they made the Doric column ſix diameters high. After that, they added another diameter to it, and made it ſeven, which augmentation ſeemed to bring it nearer to the proportion of a man, the human foot, at leaſt in our days, not being a ſixth but nearly a ſeventh part of the body.

The characters of the Doric order, as they are now managed, are, the height of its column, which is eight diameters; the frieze, which is adorned with triglyphs, drops, and metopes; its capital, which is without volutes, and its admitting of cymatiums.

It has been already obſerved, that the ancients had two Dorics; the firſt of which was the more ſimple and maſſive, and was chiefly uſed in temples; the ſecond, which was the more light and delicate, they uſed in porticos and theatres.

The Doric is uſed by the moderns, on account of its ſolidity, in large, ſtrong buildings, as in the gates of cities and citadels, the outſides of churches, and other maſſy works, in which delicacy of ornaments would not be ſuitable.

The moſt conſiderable ancient monument of this order is the theatre of Marcellus at Rome, the capital, the height of the frieze, and projecture of which are much ſmaller than in the modern architecture.

Vignola adjuſts the proportion of the Doric order as follows: he divides the whole height of the order without the pedeſtal into twenty parts, or modules, one of which he allows to the baſe; fourteen to the ſhaft, or fuſt; one to the capital; and four to the entablature: the ſeveral parts and members may be ſeen under their reſpective articles, COLUMN, CORNICHE, BASE, FRIEZE, &c.

Doric Dialect, in grammar, one of the five dialects, or manners of ſpeaking, which were principally in uſe among the Greeks.

It was firſt uſed by the Lacedemonians, particularly thoſe of Argos; afterwards it paſſed into Epirus, Lybia, Sicily, and the iſlands of Rhodes, Crete, &c.

Doric Mode, in muſic, the firſt of the authentic modes of the ancients; its character is to be ſevere, tempered with gravity and joy; and is proper upon religious occaſions, as alſo to be uſed in war.

It begins D, *la*, *ſol*, *re*. Plato admires the muſic of the Doric mode, and judges it proper to preſerve good manners, as being maſculine; and on this account allows it in his commonwealth.

Doring, or Daring, among ſportſmen, a term uſed to expreſs a method of taking larks by means of a clapnet and looking-glaſs.

DORMANT, in heraldry, is uſed for the poſture of a lion, or any other beaſt, lying along in a ſleeping attitude, with the head on the fore-paws; by which it is diſtinguiſhed from the couchant, where though the beaſt be lying, yet he holds up his head.

Dormant Tree, in architecture, ſignifies a window made in the roof of an houſe, or above the entablature, being raiſed upon the rafters.

DORMITORY, a gallery in convents or religious houſes, divided into ſeveral cells, in which the religious ſleep or lodge.

DORONICUM, leopard's bane, in botany, a genus of plants, the compound flower of which is radiated: the proper flower is funnel-formed; there is no pericarpium, but the cup, being ſlightly connivent, contains a ſolitary ſeed, vertically ovated, compreſſed, ſulcated, and crowned with a downy pap.

The root of the doronicum officinarum is ſaid to be an alexipharmic, but it is not uſed in the preſent practice.

DORSAL, an appellation given to whatever belongs to the back. See Dorsum.

Dorsal Muscles are the muſcles of the back and loins, which are for the moſt part common: there are of the extenſors uſually reckoned three on each ſide, viz. the ſacrolumbaris, the longiſſimus dorſi, and the ſemiſpinoſus: the flexors are three alſo, viz. the quadratus lumborum, the pſoas parvus, and the intertranſverſales lumborum. See each under its proper head.

Dorsal Nerves. See Nerve.

DORSIFEROUS Plants, among botaniſts, ſuch as are of the capillary kind, without ſtalks, and which bear their ſeeds on the backſide of their leaves.

The word is formed from the Latin, *dorſum*, the back, and *fero*, to bear.

DORSUM, Back, in anatomy, comprehends all the poſterior part of the trunk of the body, from the neck to the buttocks. The back is furniſhed with ſeveral muſcles, which are common to it with the loins, as the longiſſimus dorſi, the ſacro-lumbaris, and ſemiſpinoſus; theſe are called extenſors. See Extensor.

To the back likewiſe belong the intertranſverſales lumborum, the quadratus lumborum, and the pſoas. See the article Intertransversales, &c.

Its bones are the ſpina dorſi, ribs, and os ſacrum. See Spine, Rib, &c.

Dorſum is alſo uſed to denote the upper-ſide of the hand and foot, in contradiſtinction to the lower-ſide, called the palm and ſole. See Hand and Foot.

Dorsum Nasi, the ridge of the noſe. See Nose.

DOSE, in medicine and pharmacy, the quantity of a medicine given at one time; or the proportion which the ſeveral ingredients of a compound medicine bear to each other.

DOSITHEANS, *Doſithei*, in church-hiſtory, a ſect among the Hebrews, being one of the branches of the Samaritans. See the article Samaritans.

They abſtained from eating any creature that had life, and were ſo ſuperſtitious in keeping the ſabbath, that they remained in the ſame place and poſture wherein that day ſurpriſed them, without ſtirring till the next day. They married but once, and a great number never married. Doſitheus, their founder, being diſſatisfied among the Jews, retired to the Samaritans, who were reputed heretics, and invented another ſect; and to make it more authentic, he went into a cave, where, by too long abſtinence, he killed himſelf. The name of Doſitheans was alſo given to ſome of the diſciples of Simon Magus.

DOSSER, in military matters, a ſort of basket, carried on the ſhoulders of men, uſed in carrying the overplus earth from one part of a fortification to another, where it is wanted.

DOSSIL, in ſurgery, lint made into a cylindric form, or reſembling the ſhape of dates, or olive-ſtones, the ſize of which is very different. Doſſils are uſed in dreſſing a diſordered part, and are ſometimes ſecured by a thread, tied round their middle.

DOTTEREL, the Engliſh name of a bird, called by authors morinellus. See the article Morinellus.

DOUBLE Aspect, in painting. See the article Aspect.

Double Bastion, in fortification. See Bastion.

Double Cast, in huſbandry, a term uſed by the farmers for that method of ſowing that does not diſpenſe the neceſſary quantity of ſeed for a piece of land at one bout, but requires going over many places twice.

Double Descant, in muſic. See the article Descant.

Double *Horizontal Dial*, one with a double gnomon, one of which points out the hour on the outward circle, and the other ſhews the hour upon the ſtereographic projection drawn upon it. This dial not only finds the meridian, hour, &c. but ſhews the ſun's place, riſing and ſetting, declination, amplitude, altitude, and azimuth, with many other uſeful propoſitions.

Double Fichy, or Fiche, in heraldry, the denomination of a croſs, when the extremity has two points, in contradiſtinction to fiché, where the extremity is ſharpened away to one point.

Double Fugue, in muſic. See Fugue.

Double Letter, in grammar, a letter which has the force and effect of two. The Greeks have three of theſe, viz. Ζ, Ξ, Ψ; the Latins have two, X and Z; and moſt of the modern languages have the ſame.

Double Pedestal. See Pedestal.

Double Plea, in law, is where the defendant in a ſuit alleges two ſeveral matters in bar of the plaintiff's action, when one of them is ſufficient. This is not admitted in common law. Thus when a perſon pleads ſeveral things, the one having no dependance upon the other, ſuch plea is accounted double, and will not be admitted; but where the things pleaded mutually depend on each other, and the party cannot have the laſt plea without the firſt, there the whole ſhall be received.

Double Plough. See Plough.

Double Point, in the higher geometry. See Curves *of the ſecond Order*.

Double Position. See Position.

Double Quarrel, a complaint made by any clerk, or other, to the archbiſhop of a province, againſt an inferior ordinary for delaying juſtice in ſome ſpiritual cauſe, as to give ſentence, inſtitute a clerk, or the like.

Double Vessel, in chemiſtry, is when the neck of one bolt-head or mattraſs is put and well luted into the neck of another, in order to refine and exalt ſpirits as high as can be. It is ſometimes called a pelican, alſo a diota.

DOUBLET, among lapidaries, implies a counterfeit ſtone compoſed of two pieces of cryſtal, and ſometimes glaſs, ſoftened together with proper colours between them, ſo as to appear the ſame to the eye, as if the whole ſubſtance of the cryſtal had been tinged with thoſe colours.

The impracticability of imparting tinges to the body of cryſtals, while in their proper and natural ſtate, and the ſoftneſs of glaſs, which renders ornaments made of it greatly inferior in wear to cryſtal gave inducements to the introduction of colouring the ſurface of cryſtal, wrought into a proper form, in ſuch manner, that the ſurfaces of two pieces ſo coloured being laid together, the effect might appear the ſame, as if the whole ſubſtance of the cryſtal had been tinged. The cryſtals, and ſometimes white tranſparent glaſs, ſo treated, were called doublets; and at one time prevailed greatly in uſe, on account of the advantages, with reſpect to wear, ſuch doublets had, when made of cryſtal, over glaſs, and the brightneſs of the colours, which could with certainty be given to counterfeit ſtones this way, when coloured glaſs could not be procured; or at leaſt not without a much greater expence. Doublets have not indeed the property which the others have, of bearing to be ſet tranſparent, as is frequently required in drops of ear-rings and other ornaments: but when mounted in rings, or uſed in ſuch manner that the ſides of the pieces, where the joint is made, cannot be inſpected, they have, when formed of cryſtal, the title to a preference to the coloured glaſs; and the art of managing them is therefore, in ſome degree, of the ſame importance with that of preparing glaſs for the counterfeiting gems; and is therefore properly an appendage to it, as being entirely ſubſervient to the ſame intention. The manner of making doublets is as follows:

Let the cryſtal or glaſs be firſt cut by the lapidaries in the manner of a brilliant, except that, in this caſe, the figure muſt be compoſed from two ſeparate ſtones, or parts of ſtones, formed in the manner of the upper and under parts of a brilliant, if it was divided in an horizontal direction, a little lower than the middle. After the two plates of the intended ſtone are thus cut, and fitted ſo exactly, that no diviſion can appear when they are laid together, the upper part muſt be poliſhed ready for ſetting; and then the colour muſt be put betwixt the two places by this method. "Take of Venice or Cyprus turpentine two ſcruples; and add to it one ſcruple of the grains of maſtich choſen perfectly pure, free from foulneſs, and previouſly powdered. Melt them together in a ſmall ſilver or braſs ſpoon ladle, or other veſſel, and put to them gradually any of the coloured ſubſtances below mentioned, being firſt well powdered; ſtirring them together as the colour is put in, that they may be thoroughly commixed. Warm then the doublets to the ſame degree of heat, as the melted mixture; and paint the upper ſurface of the lower part, and put the upper one inſtantly upon it; preſſing them to each other; but taking care, that they may be conjoined in the moſt perfectly even manner. When the cement or paint is quite cold, and ſet, the redundant part of it, which has been preſſed out of the joint of the two pieces, ſhould be gently ſcraped off the ſide, till there be no appearance of any colour on the outſide of the doublets: and they ſhould then be skilfully ſet; obſerving to carry the mounting over the joint, that the upper piece may be well ſecured from ſeparating from the under one."

The colour of the ruby may be beſt imitated, by mixing a fourth part of carmine with ſome of the fineſt crimſon lake that can be procured.

The ſaphire may be counterfeited by very bright Pruſſian blue, mixed with a little of the abovementioned crimſon lake, to give it a caſt of the purple. The Pruſſian blue ſhould not be very deep-coloured, or but little of it ſhould be uſed: for otherwiſe, it will give a black ſhade that will be injurious to the luſtre of the doublets.

The emerald may be well counterfeited by diſtilled verdigriſe, with a little powdered aloes. But the mixture ſhould not be ſtrongly heated, nor kept long over the fire after the verdigriſe is added: for the colour is to be ſoon impaired by it.

The reſemblance of the garnet may be made by dragon's blood; which, if it cannot be procured of ſufficient brightneſs, may be helped by a very ſmall quantity of carmine.

The amethyſt may be imitated by the mixture of ſome Pruſſian blue with the crimſon lake: but the proportions can only be regulated by direction; as different parcels of the lake and Pruſſian blue vary extremely in the degree of ſtrength of the colour.

The yellow topazes may be counterfeited by mixing the powdered aloes with a little dragon's blood, or by good Spaniſh anatto: but the colour muſt be very ſparingly uſed, or the tinge will be too ſtrong for the appearance of that ſtone.

The chryſolite, hyacinth, vinegar garnet, eagle marine, and other ſuch weaker or more diluted colours, may be formed in the ſame manner, by leſſening the proportions of the colours, or by compounding them together correſpondently to the hue of the ſtone to be imitated; to which end it is proper to have an original ſtone, or an exact imitation of one at hand, when the mixture is made, in order to the more certain adapting the colours to the effect deſired: and when theſe precautions are taken, and the operation well conducted, it is practicable to bring the doublets to ſo near a reſemblance of the true ſtones, that even the beſt judges cannot diſtinguiſh them, when well ſet, without a peculiar manner of inſpection.

There is, however, an eaſy method of diſtinguiſhing doublets, which is only to behold them betwixt the eye and light, in ſuch poſition, that the light may paſs thro' the upper part and corners of the ſtone; and that there is no colour in the body of the ſtone.

DOUBLING, in the military art, is the putting two ranks or files of ſoldiers into one.

Doubling, among hunters, who ſay that a hare doubles, when ſhe keeps in plain fields, and winds about to deceive the hounds.

Doubling, in the manege, a term uſed of a horſe, who is ſaid to double his reins, when he leaps ſeveral times together, to throw his rider: thus we ſay, the ramingue doubles his reins, and makes pontlevis.

Doubling, in navigation, the act of ſailing round a cape, point of land, &c. ſo as that the cape or point of land becomes between the ſhip and her former ſituation, or between any obſerver and the ſhip.

Doubling *upon*, in a ſea-fight, is when part of one fleet, either by having a greater number of ſhips, or by taking the advantage of the wind with a ſuperior skill, encloſes part of the enemy's fleet between two fires, ſo that they are attacked on both ſides; a circumſtance which expoſes them to the greateſt danger, and uſually throws them into confuſion. See Engagement and Line.

Doublings, in heraldry, the linings of robes and mantlings in atchievements.

DOUBLON, or Doubloon, a Spaniſh and Portugueſe coin, being the double of a piſtole. See Pistole.

DOUBTING, *Dubitatio*, the act of with-holding our aſſent from any propoſition, on ſuſpicion that we are not thoroughly appriſed of the merits thereof; or from not being able peremptorily to decide between the reaſons for and againſt it.

Doubting, in rhetoric, ſignifies the debate of the mind with itſelf, upon a preſſing difficulty. It is for the moſt part expreſſed by interrogation, though that is not neceſſary.

DOUCINE, in architecture, a moulding concave above and convex below, ſerving commonly as a cymatium to a delicate corniche. It is likewiſe called gula. See Cymatium and Gula.

DOVE, *Columba*, in ornithology. See Pigeon.

Dove-Tailing, in carpentry, is the manner of faſtening boards together by letting one piece into another, in the form of the tail of a dove. The dove-tail is the ſtrongeſt of the aſſemblages or jointings, becauſe the tenon or piece of wood which is put into the other, goes widening to the extreme, ſo that it cannot be drawn out again, by reaſon the extreme or tip is bigger than the line.

DOWAGER, *Dotiſſa*, a widow endowed, is a title applied to the widows of princes, dukes, earls, and perſons of high rank only.

DOWER, that portion which the law allows a widow out of the lands of her huſband, after his deceaſe. It is diſtinguiſhed into five kinds: 1. Dower by the common law, is a third part of ſuch lands and tenements as the huſband was ſolely ſeized in fee or tail, during the overture, and this the widow is to enjoy during her life. 2. Dower by cuſtom, that part of the huſband's eſtate, to which the widow is entitled, after the death of her huſband, by the cuſtom of ſome manor, ſo long as ſhe ſhall live ſingle and chaſte. This is ſometimes more than one third part, for in ſome places ſhe has half the land, and in others the whole, during life. See the article *Free* Bench. 3. Dower *ad oſtium eccleſiæ*, formerly made by the huſband immediately after the marriage, when the particular lands were expreſsly named, of which his wife ſhould be endowed. 4. Dower *ex aſſenſu patris*, made of lands named by a ſon who was huſband with the conſent of his father; and this was always reduced into writing as ſoon as the ſon was married.

ried. 5. Dower *de la plus belle*, which was where the wife was endowed with the faireſt part of the huſband's eſtate. Of theſe five, the two firſt only of theſe writs of dower are now in uſe.

Admeaſurement of DOWER. See the article ADMEASUREMENT.

Aſſignment of DOWER, the ſetting out a woman's marriage portion by the heir.

Tenant in DOWER. See TENANT.

DOWLE-STONES, in our old writers, the ſame with land-marks.

DOWRY, *Dos*, is properly the money or fortune which the wife brings her huſband in marriage: it is otherwiſe called *maritagium*, marriage-goods, and differs from dower. See DOWER.

DOWRY is alſo uſed, in a monaſtic ſenſe, for a ſum of money given along with a maid, upon entering her in ſome religious order.

DOXOLOGY, an hymn uſed in praiſe of the Almighty, diſtinguiſhed by the title of greater and leſſer.

The leſſer doxology was anciently only a ſingle ſentence, without reſponſe, running in theſe words, "Glory be to the Father, and to the Son, and to the Holy Ghoſt, world without end. Amen." Part of the latter clauſe, "As it was in the beginning, is now, and ever ſhall be," was inſerted ſome time after the firſt compoſition. Some read this ancient hymn, "Glory be to the Father, and to the Son, with the Holy Ghoſt." Others, "Glory be to the Father, in or by the Son, and by the Holy Ghoſt." This difference of expreſſion occaſioned no diſputes in the church, till the riſe of the Arian hereſy; but when the followers of Arius began to make uſe of the latter, as a diſtinguiſhing character of their party, it was entirely laid aſide by the Catholics, and the uſe of it was enough to bring any one under ſuſpicion of heterodoxy. The doxology was uſed at the cloſe of every ſolemn office. The Weſtern church repeated it at the end of every pſalm, and the Eaſtern church at the end of the laſt pſalm. Many of their prayers were alſo concluded with it, particularly the ſolemn thankſgiving, or conſecration prayer at the euchariſt. It was alſo the ordinary concluſion of their ſermons.

The greater doxology, or angelical hymn, was likewiſe of great note in the ancient church. It began with theſe words, which the angels ſung at our Saviour's birth, "Glory be to God on high, &c." It was chiefly uſed in the communion ſervice, and in mens private devotions. In the Mozarabic liturgy, it is appointed to be ſung before the leſſons on Chriſtmas-day; and St. Chryſoſtom obſerves, that the Aſcetics met together daily to ſing this hymn. Both the doxologies have a place in the church of England, the former being repeated after every pſalm, and the latter uſed in the communion ſervice.

DRACHM, a Grecian coin, of the value of ſevenpence three farthings.

DRACO VOLANS, in meteorology, a fiery exhalation, frequent in marſhy and cold countries.

It is moſt common in ſummer, and though principally ſeen playing near the banks of rivers, or in boggy places, yet ſometimes mounts up to a conſiderable height in the air, to the no ſmall terror of the amazed beholders; its appearance being that of an oblong, ſometimes roundiſh, fiery body, with a long tail. It is entirely harmleſs, frequently ſticking to the hands and cloaths of people without injuring them in the leaſt.

DRACO, in aſtronomy, a conſtellation of the northern hemiſphere, ſaid by different authors to contain 31, 32, 33, or even 49 ſtars.

DRACUNCULI, in medicine, ſmall long worms, which breed in the muſcular parts of the arms and legs, called Guinea-worms.

This diſtemper is very common in Guinea, and principally among the natives; Kempfer found it ſo alſo at Ormuz, upon the Perſian gulph, and likewiſe in Tartary. Dr. Tawne, in his Treatiſe of the Diſeaſes of the Weſt-Indies, informs us, that this diſtemper is not ſo frequent any where as on the Gold Coaſt, at Anamboe, and Cormantyn.

The worm is white, round, and uniform, very much reſembling white round tape or bobbing. It is lodged between the interſtices and membranes of the muſcles, where it inſinuates itſelf, ſometimes exceeding five ells in length. It occaſions no great pain at the beginning, but at ſuch times as it is ready to make its exit, the parts adjoining to the extremity of the worm, where it attempts its excluſion, begin to ſwell, throb, and be inflamed: this generally happens about the ancle, leg, or thigh, and rarely higher.

The countries where this diſtemper is obſerved, are very hot and ſultry, liable to great droughts, and the inhabitants make uſe of ſtagnating and corrupted water, in which it is very probable that the ova of theſe animalcula may be contained; for the white people who drink this water, are obnoxious to the diſeaſe as well as the negroes.

The ſurgeons ſeldom attempt to extract this worm by making an inciſion; but as ſoon as they perceive the tumour riſe to a competent bulk, they endeavour to bring it to a ſuppuration, with all convenient expedition; and then the head of the worm diſcovers itſelf, which they ſecure, by tying it to a bit of ſtick or cotton, that it may not draw itſelf up again: thus they continue to roll it round the ſtick, ſometimes one inch, ſometimes two or more, each day, taking great care not to break the worm, elſe it will be very difficult to recover the end of it again; and an abſceſs will be formed, not only at the ſuppurated part, but likewiſe through the whole winding of the muſcles, where the dead putrifying worm remains, which generally occaſions very obſtinate ulcers. During the extraction of the worm, the patient ſhould be plied with bitter aloetic and other anthelmintic medicines, in order to diſlodge the worm the ſooner from his tenement. When the worm is totally extracted, the remaining ulcer may be treated in the ſame manner as other common ulcers; nor does any farther inconvenience remain in the parts of which it had poſſeſſion. This diſeaſe, ſimply conſidered, very rarely, if ever, proves mortal.

DRACUNCULI is alſo uſed for a diſeaſe in children, ariſing from little worms called by that name. See the article WORM.

DRACUNCULUS, dragons, in botany, a genus of plants, with ſmooth gloſſy leaves, ſet on long pedicles, divided into ſix or ſeven or more long narrow ſegments; and a ſingle, thick, whitiſh ſtem, elegantly variegated with reddiſh or purpliſh ſtreaks, compoſed as it were of membranes enveloping one another: on its top is a long ſheath, greeniſh on the out-ſide and purpliſh within, encloſing a dark coloured piſtil, like that of arum, but larger, ſucceeded by a cluſter of red berries: the root is large, roundiſh, externally yellowiſh, internally white. It is perennial, a native of the ſouthern parts of Europe, and cultivated in our gardens.

The dracunculus appears to be ſimilar in medicinal virtues, as in botanic characters, to arum; the roots and leaves being, like thoſe of that plant, extremely acrimonious, ſeeming, when ſlightly taſted, to burn or corrode the tongue, and continuing to painfully vellicate the part for many hours. The acrimonious matter is likewiſe of the ſame kind in regard to its pharmaceutical properties; being in great part diſſipated or deſtroyed by exſiccation; not being diſſoluble either by watery or ſpirituous menſtrua; not riſing with either menſtruum in diſtillation, but being deſtroyed in the proceſs; being extracted, by expreſſion, along with the watery juice; but ſoon ſeparating from the aqueous fluid, and being now found, though not a little weakened, in the fecula or ſediment. This plant might therefore be uſed in the ſame caſes as arum, but general practice employs only the latter. So far as can be judged between ſubſtances of ſuch vehement pungency, the dracunculus is rather the ſtrongeſt of the two. See the article ARUM.

DRAGANT, the ſame with tragacanth. See the article TRAGACANTH.

DRAGOMAN, DROGMAN, or DRUGGERMAN, a name given in the Levant to the interpreters kept by the ambaſſadors of Chriſtian nations reſiding at the Porte, to aſſiſt them in treating of their maſters affairs.

DRAGON, *Draco*, in zoology, an animal called alſo the flying lizard, being furniſhed with two lateral, membranaceous, and radiated wings: it is a true lizard, with a naked and four-legged body, and a long tail: though there are not wanting ſome who deny the exiſtence of any ſuch animal. See plate LIV. *fig.* 6.

Dragon's Belly, in aſtronomy. See the article Venter Draconis.

Dragon's Blood, *Sanguis Draconis*, in natural hiſtory, a moderately heavy reſin, of a red colour, brought from the Eaſt Indies. There are two ſorts of it; one in ſmall oval drops or tears, of a fine deep red, which is heightened into a crimſon on grinding them into powder; the other is in larger maſſes, apparently compoſed of tears: of theſe, ſome are of a pale dull red, others of a deep one, not at all inferior to the drop ſort.

The drops and the lumps are ſuppoſed to be the produce of two different trees. The lump ſort is ſaid to exude from the trunks of certain palms growing in the Madeira and Canary iſlands; the drops to be artificially extracted from the fruit of a tree. According to Kempfer, the fruit is laid upon a kind of hurdle, over a large veſſel half full of water. The whole being lightly covered, the water is made to boil, when the fruit being ſoftened by the ſteam, a red juice, which was not diſcoverable in it before, appears upon the ſurface: this is ſcraped off upon flag leaves, and expoſed to the air to dry. The ſame author informs us, that ſome of the preparers of this commodity boil the fruit in water till all the colouring particles are extracted or melted out; after which, the aqueous fluid is evaporated till the remainder begins to thicken, when it is further exſiccated upon flag leaves as before.

This drug has been ſometimes counterfeited with artificial compoſitions, coloured with the true dragons blood or Brazil wood: theſe are diſtinguiſhed by their either diſſolving in water like gums, or crackling, and not burning in the fire.

The genuine dragon's blood is not acted upon by water, or at moſt communicates to it only a ſlight yellowiſh tinge: laid on a red-hot iron, it readily melts, catches flame, and emits an acid fume approaching to that of benzoine. It diſſolves, but not perfectly, in rectified ſpirit of wine, and tinges a large quantity of the menſtruum of an elegant blood-red colour: it diſſolves readily in oils, and tinges them of a pretty deep red, but ſomewhat leſs beautiful than the colour of the ſpirituous tincture, and conſiderably leſs ſo than that which anchuſa imparts to oil.

The ſpirituous tincture ſtains cold marble of a bright fleſh colour; to warm marble it gives a deeper red, in proportion to the degree of heat. Mr. du Fay obſerves, that by this one ingredient, with the addition of a little pitch for the darker colours, all the various ſhades of red may be obtained, from the lighteſt to the deepeſt; that it does not ſink near ſo far into cold as into hot marble; and that the not ſinking is rather an advantage than an imperfection, as the colours which ſink muſt alſo ſpread, ſo as to render the drawing of fine deſigns impracticable; that the beſt way of obtaining beautiful reds from dragon's blood is, to put the powdered reſin into ſpirit of wine over the fire, and apply on the marble with a pencil, the finer part of the ſolution which riſes up about the ſides of the veſſel, adding freſh ſpirit in proportion to the evaporation, till the dragon's blood yields no more tincture.

This reſin, in ſubſtance, has no ſmell or taſte: when diſſolved, it diſcovers a ſlight degree of pungency. It is uſually looked upon as a gentle incraſſant, deſiccative, and reſtringent; and ſometimes preſcribed in theſe intentions againſt alvine and uterine fluxes, and ulcerations both internal and external.

Dragon-Fly, the Engliſh name of the libella. See the article Libella.

Dragon's Head and **Tail**, the two nodes of the moon. See the article Node.

Dragon-Shell, the Engliſh name of a ſpecies of concamerated patella, with its roſtrum very much bent. See the article Patella.

DRAGONNEE, in heraldry, a lion dragonnée is where the upper half reſembles a lion, the other half going off like the hinder part of a dragon. The ſame may be ſaid of any other beaſt as well as a lion.

DRAGOON, in military affairs, a muſqueteer, mounted on horſeback, who ſometimes fights or marches on foot, as occaſion requires.

Dragoon, in ornithology, the name of a ſmall kind of carrier-pigeon, called *columba tabellaria minima*, by Moore. It is a baſtard breed between the two ſpecies of pigeons called the horſeman and the tumbler. They are very good breeders; and as they are lighter than the horſeman, they are ſuppoſed to be more expeditious in flight for a few miles; but the horſeman excels them in greater lengths.

DRAINING *of Lands*. See the article Fen.

DRAINS, a name given, in the fen-countries, to certain large cuts or ditches, of twenty, thirty, nay ſometimes forty feet wide, carried through the marſhy ground, to ſome river, or other place, capable of diſcharging the water they carry out of the fen lands. See the article Fen.

DRAKE, in ornithology, the male of the duck-kind. See Duck.

DRAM, or **Drachm**, in commerce, a ſmall weight. See Weight.

DRAMA, a poem containing ſome certain action, and repreſenting a true picture of human life, for the delight and improvement of mankind.

The principal ſpecies of the drama are two, comedy and tragedy. Some others there are of leſs note, as paſtoral, ſatire, tragi-comedy, opera, &c. See the articles Tragedy, Comedy, &c.

The primary parts of the drama, as divided by the ancients, are the protaſis, epitaſis, cataſtaſis, and cataſtrophe. The ſecondary parts are the acts and ſcenes. The acceſſary parts are the prologue, chorus, mimus, and epilogue, which pointed out the uſe of the piece, or conveyed ſome other notice to the audience in the poet's name. See Protasis, Prologue, Chorus, &c.

The drama, ſays Voſſius, owes its riſe to the days of feſtivity; for in ancient times, it was uſual for men, when they gathered in the fruits of the earth, to meet together, that they might ſacrifice to the Deity, and unbend their minds from the fatigues of the harveſt. Hence aroſe two ſorts of poetry, the one grave, in praiſe of the gods, the other jocoſe and full of lampoon, againſt one another. Thus, from the former aroſe tragedy, and from the latter, ſatire, comedy, and mimickry.

The drama, in ſome circumſtances, is ſuperior to epic poetry, particularly in action; for in the drama, the perſons themſelves are introduced, every thing is tranſacted in our ſight, and our eyes and ears at once are gratified. Beſides, the action in the drama is much more compendious than in the epic: it takes up leſs time, and therefore requires more art to conduct it. It excites in the mind more rapid commotions, and conſequently makes the pleaſure and admiration more intenſe. For which reaſons Ariſtotle gives the preference to the drama; not that he reckons it more noble in general than the epic, for that would be contrary to truth and reaſon, but only as far as its ſphere extends.

According to the Abbe du Bos, tragic poets ought to place their ſcenes in times remote from that in which they live; but that comedy, on the contrary, ought to be fixed in the very places and times in which it is repreſented; its deſign being to make us laugh at the expence of ridiculous perſons, in order to purge us of thoſe faults it expoſes. Now we cannot diſtinguiſh nature ſo eaſily, when ſhe appears in ſtrange cuſtoms, manners, and apparel, as when ſhe is clad, as it were, after our own faſhion; whereas we always diſtinguiſh human nature in the heroes of tragedies, whether their ſcenes be at Rome or Sparta, by reaſon only great virtues or great vices are there repreſented.

The dramatic poetry of the Romans was at firſt divided into three ſorts, tragedy, ſatire, and comedy; which were afterwards ſubdivided into ſeveral ſpecies. They had two ſpecies of tragedies, viz. the tragœdiæ palliatæ, in which the perſonages, manners, and dreſs, were entirely Greek; and the tragœdiæ prætextatæ, or prætextæ, wherein the perſonages and manners were Roman. The ſatire was a kind of paſtoral poetry, which ſome authors aſſert to have held a kind of middle rank between tragedy and comedy; which is almoſt all we know of it. Comedy, in like manner as tragedy, was divided firſt into two ſpecies, viz. the Greek, or palliata; and the Roman, or togata, by reaſon of the introducing plain citizens into the latter, whoſe dreſs was called toga. The Roman comedy was again ſubdivided into four ſpecies; the togata, properly ſo called, the tabernaria, the attellana, and the mimus. Pieces of the firſt ſort were very ſerious, and admitted even of perſons of diſtinction, for which reaſon they were ſometimes called prætextatæ. The ſecond were comedies of a leſs ſerious nature, and took their name from taberna; which ſtrictly ſignified a place of rendezvous, proper for aſſembling perſons of different conditions, whoſe characters were played off in thoſe pieces. The attellana was a kind of piece very like the Italian comedies; that is, thoſe whoſe dialogues are not written. The actor, therefore, of the attellanæ performed his part juſt as he pleaſed. The mimus reſembled our farces, and the actors thereof performed always bare-foot: whereas, in tragedy, they wore a ſort of ſhoe, or boot, called cothurnus; and, in the other ſpecies of comedy, another kind called ſoccus.

For the laws of the drama, ſee the articles UNITY, ACTION, CHARACTER, FABLE, &c.

DRAMATIC, in poetry, an epithet given to pieces written for the ſtage.

DRANK, in huſbandry, a term uſed to denote wild oats, which never fail to infeſt worn-out lands; ſo that when ploughed lands run to theſe weeds and thiſtles, the farmer knows it is high time to fallow them, or elſe to ſow them with hay-ſeed, and make paſture of them.

Some indeed deſtroy the drank, by ſowing the lands with beans, and letting looſe ſheep upon them when young. This muſt be done in dry weather, and the ſheep eat up the drank and other weeds, without touching the beans.

DRAPERY, in ſculpture and painting, implies the repreſentation of the clothing of human figures, and alſo hangings, tapeſtry, curtains, and moſt other things that are not carnations or landſcapes.

The art of drapery conſiſts, 1. In the order of the folds or plaits, which ought to be ſo managed, that you may eaſily perceive what it is they cover, and diſtinguiſh it from any thing elſe. Again, the folds ought to be large, as breaking and dividing the ſight the leſs; and there ſhould be a contraſt between them, otherwiſe the drapery will be ſtiff. 2. In the quality of the ſtuffs; for ſome make their folds abrupt and harſh, others more ſoft and eaſy: the ſurface of ſome have a luſtre, others are flat and dead; ſome are fine and tranſparent, others firm and ſolid. 3. In the variety of colours, which, when well managed, makes the greateſt beauty of painting; all not being equally amicable and friendly with reſpect to each other, and ſome never to be placed near certain others.

M. De Piles obſerves, that drapery muſt never be made to adhere to the parts of the body; that a great motion and lightneſs of the drapery are only proper in figures in great agitation, or expoſed to the wind; and that the nudities of the figures ſhould always be deſigned, before the painter proceeds to the draperies.

The following directions are to be obſerved. Draw the out-lines of garments lightly, beginning with the great folds, which you may afterwards ſtroke into leſſer; but be ſure they croſs not one another. Make the drapery bend with the body, according as it ſtands in or out, ſtraight or crooked, or turns one way or another; obſerving that the cloſer the garment fits on the body, the narrower and ſmaller muſt the folds be. All the folds muſt conſiſt of two lines, and no more; which you may turn with the garment at pleaſure, ſhadowing the inner deep, and the outermoſt more light; and if the folds be never ſo curiouſly contrived, ſpare not to ſhadow them, if they fall inward from the light, with a double or triple ſhadow, as the occaſion requires. The out-lines muſt be continued through the whole garment; the leſſer you may break off and ſhorten as you pleaſe. The ſhades in ſilk and fine linen require little folds, and a light and rare ſhadow; and ſo alſo fine drapery requires more and ſharper folds than coarſe. Obſerve the motion of the wind and air for drawing looſe apparel all one way; and examine the nature and diſpoſition of light, eſpecially as it has relation to the ſun or any bright body. Moreover, the plaits and folds muſt have their motions according as they are managed by the wearer, as under the arm, and under the knee, by opening and ſtretching out the arm and leg, making always hard, ſtiff, and groſs folds, that by their appearance the nature and quality of the garment may be known, &c. But mean motions, ſuch as appear in the folds of ſtuff and other cloths of fine wool, may become pliable to a perſon's limbs, and ſo made not only into ſweet and pleaſant folds, but may follow the bare fleſh very well, falling pliably about the loins or any other part. In other kinds of mixed motions, called turnings or croſſings, which are proper unto damaſks, cloths of gold, &c. the folds croſſing and breaking one another, appear from the various qualities of the drapery, and muſt be ſo performed, as not to ſavour of an over-affected imitation, without grace or order.

DRASTIC, in phyſic, an epithet beſtowed on ſuch medicines as are of preſent efficacy, and potent in operations; and is commonly applied to emetics and cathartics.

DRAUGHT, or DRAFT, in architecture, the figure of an intended building, deſcribed on paper, in which is laid down, by ſcale and compaſſes, the ſeveral diviſions and partitions of the apartments, rooms, doors, paſſages, &c. in their due proportion to the whole building.

It is cuſtomary, and alſo exceedingly convenient, for any perſon, before he begins to erect a building, to have deſigns or draughts drawn upon paper or vellum, wherein the ichnography or ground-plot of every floor or ſtory is delineated; as alſo the form or faſhion of each front, with the windows, doors, ornaments, in an orthography, or upright. Sometimes the ſeveral fronts, &c. are taken and repreſented in the ſame draught, to ſhew the effect of the whole building, which is called ſcenography, or perſpective. See the article SCENOGRAPHY.

DRAUGHT-COMPASSES are ſuch as have moveable points to draw fine draughts in architecture.

DRAUGHT, in trade, called alſo CLOFF or CLOUGH, is a ſmall allowance on weighable goods, made by the king to the importer, or by the ſeller to the buyer, that the weight may hold out when the goods are weighed again.

The king allows 1 ℔ draught for goods weighing no leſs than 1 C wt. 2 ℔ for goods weighing between 1 and 2 C wt. 3 ℔ for goods weighing between 2 and 3 C wt. 4 ℔ from 3 to 10 C wt. 7 ℔ from 10 to 18 C wt 9 ℔ from 18 to 30, or upwards.

DRAUGHT-HOOKS are large hooks of iron, fixed on the cheeks of a cannon-carriage, two on each ſide, one near the trunnion hole, and the other at the train, diſtinguiſhed by the name of fore and hind draught-hooks. Large guns have draught-hooks near the middle tranſum, to which are fixed the chains that ſerve to keep the ſhafts of the limbers on a march. The fore and hind hooks are uſed for drawing a gun backwards or forwards by men with ſtrong ropes, called draught-ropes, fixed to theſe hooks.

DRAUGHT-HORSE, in farming, a ſort of coarſe made horſe, deſtined for the ſervice of the cart or plough. In the choice of theſe horſes, for what is called the ſlow draught, they are to be choſen of an ordinary height; for otherwiſe, when put into the cart, one draws unequally with the other, and the tall ones hang upon the low ones. The draught-horſe ſhould be large bodied, and ſtrong loined, and of ſuch a diſpoſition as rather to be too dull than too briſk; and rather to crave the whip than to draw more than is needful. Mares are the fitteſt for this uſe for the farmer, as they will be kept cheap, and not only do the work, but be kept breeding, and give yearly increaſe of a foal of the ſame kind, and fit to be bred to the ſame purpoſes. They ſhould have a good head, neck, breaſt, and ſhoulders: for the reſt of the ſhape, it is not of much conſequence, only for breeding; the mare ſhould have a large belly; for the more room a foal has in the dam, the more fit he will be for that employ. See the article FOAL.

DRAW-BACK, in commerce, certain duties, either of the cuſtoms or of the exciſe, allowed upon the exportation of ſome of our own manufactures; or upon certain foreign merchandiſe, that have paid duty on importation.

Draw-Bridge, a bridge made after the manner of a floor, to draw up, or let down, as occaſion ſerves, before the gate of a town or caſtle. See Bridge.

A draw-bridge may be made after ſeveral different ways, but the moſt common are made with plyers, twice the length of the gate, and a foot in diameter. The inner ſquare is traverſed with a croſs, which ſerves for a counterpoiſe; and the chains which hang from the extremities of the plyers to liſt up or let down the bridge, are of iron or braſs.

In navigable rivers it is ſometimes neceſſary to make the middle arch of bridges with two moveable platforms, to be raiſed occaſionally, in order to let the maſts and rigging of veſſels paſs through. This kind of draw-bridge is repreſented in plate LIV. *fig.* 7. where A B is the width of the middle arch; A L and B L, the two piers that ſupport the draw-bridge N O; one of the platforms of which is raiſed, and the other let down, having the beam P Q for its plyer. To N O are ſuſpended two moveable braces E H, E H, which, reſting on the ſupport E, preſs againſt the bracket M, and thereby ſtrengthen the draw-bridge. Theſe braces are conducted to the reſt by means of the weight S, pulling the chain SLE.

Draw-Gear denotes any kind of harneſs for draught horſes.

DRAWER *of a Bill of Exchange*, the perſon who draws the bill upon his correſpondent.

DRAWING, in general, denotes the action of pulling out, or haling along: thus we read of tooth-drawing, wire-drawing, &c. See Tooth and Wire.

Drawing, the art of repreſenting the appearances of objects by imitation, or copying without the aſſiſtance of mathematical rules.

The general precepts for drawing, are as follow: 1. Begin with plain, geometrical figures, as lines, angles, triangles, polygons, arches, circles, ovals, cones, cylinders, and the like, being the foundation of all other proportions. The circle is of uſe in the ſeveral orbicular forms, as the ſun, moon, globes, &c. the oval in giving a juſt proportion to the face and mouth; and the ſquare confines a picture you are to copy, &c. the triangle is of uſe in drawing a ſide or half face; angles and arches in perſpective, and the polygon in ground-plots, fortifications, &c. the cone, in ſpires, ſteeples, tops of towers, &c. the cylinder, in columns, pillars, pilaſters, &c. See the article Perspective.

2. Having brought your hand to be fit and ready in general proportions, accuſtom yourſelf to give every object its due ſhade, according to its concavity or convexity, and to elevate or depreſs the ſame, as the object appears either nearer or farther off the light. See the articles Proportion, Design, and Shade.

3. The ſecond practice of drawing conſiſts in forming fruits, as apples, pears, cherries, &c. with their leaves; the imitation of flowers, as roſes, tulips, carnations, &c. herbs, trees, &c. of different kinds.

4. The third, in the imitation of beaſts, fowls, fiſhes, &c.

5. The fourth practice of drawing conſiſts in the imitation of the body of men, with all its lineaments, as head, noſe, eyes, ears, cheeks, arms, and ſhadows, all exactly proportioned, both to the whole, and to one another.

6. The fifth is in the drapery, in the imitation of cloathing, and artificially ſetting off the outward coverings, habit, and ornaments of the body, either of cloth, ſtuff, ſilk, or linen, in their natural and proper folds. See Drapery.

7. In drawing of all the forms before-mentioned, it is requiſite to be firſt perfect in the laying down the exact proportion; ſecondly, in the general or outward lines, before you proceed to ſhadowing, or trimming the work within.

8. In mixed and uncertain forms, where the circle, ſquare, &c. will be of no uſe, but only in the idea thereof in your own fancy, as horſes, oxen, and the like, you muſt do it by judgment, and ſo gain the true proportions by aſſiduous practice: thus, having the ſhape of the thing in your mind, firſt draw it rudely with a coal; then, with more exactneſs, with a lead or pencil; then peruſe it well, and mend it in thoſe parts you have erred in, according to the idea you carry in your mind. When it is mended by your own judgment, compare it with ſome good pattern of the ſame kind, and amend it by that.

9. Having good copies to draw after, learn to reduce them to other proportions, either larger or ſmaller, and this by frequent practice.

10. Let a perfection in drawing be attained by diligent exerciſe, and the inſtruction of a good maſter, before there be any attempts as to colouring and painting; for the former being attained, the reſt will be eaſily underſtood, and gained by frequent practice.

Particular Obſervations with regard to Drawing, are as follow: 1. If you draw after a print or picture, place it in ſuch a light, that the gloſs of the colours may not interrupt your light, and that the light and your eye may equally and obliquely fall upon the piece, which ſhould be placed at ſuch a diſtance, that, upon opening your eye, you may view it at once: the larger the picture is, the greater diſtance off it ſhould be placed: it ſhould alſo be right before you, and a little reclining.

2. Draw your out-lines at firſt very faint, and with a coal; and let them be drawn agreeable to the pattern, before you begin to ſhadow any part of it. When you have drawn one feature, it ſhould, in ſome meaſure, be a direction for you to draw the other, by obſerving the diſtance from that to the next feature; making a ſmall mark at the place with your coal, then draw it, and ſo to the next, till you have drawn the whole figure.

3. Then obſerve the middle of the picture you would copy, and touch upon the paper with the point of your coal: afterwards obſerve the more conſpicuous and uppermoſt figures, if there are more than one, which you are to touch lightly in their proper places: thus running over the whole draught, you will ſee, as it were, the ſkeleton of the piece to draw.

4. Having made out theſe ſketches, view them diligently, if they anſwer your pattern or not; for the geſtures of the life ought to ſhew themſelves eminently in the firſt and rudeſt draughts thereof: correct and mend whatever you perceive amiſs, adding and diminiſhing as it varies from the pattern; by which method it will be brought nearer to the life.

5. Obſerve the diſtance of one limb, joint, or muſcle, from another, and the ſame in all other accidents of the figure, their length, breadth, turnings, &c. ſhadow next to the light very faintly; and where you ſee bold and free touches, be not timorous in expreſſing the ſame. In drawing a head by the life, or otherwiſe, take care to place the features exactly right upon the croſs lines, whether it be a full face, or three quarter face. In fore-ſhortening you muſt make the croſs lines to fly upwards, where they look upwards; but where the aſpect is downwards, they muſt be made downwards, in a circular manner. Having drawn the out-lines true, with a coal, you are to proceed to trace the ſame lines again with a pen, Indian ink, &c. drawing them with more exactneſs, and by imitating all the hatches with their exact diſtances one from another, their croſſings, turnings, and windings, with more boldneſs and freedom perfect your deſign.

6. In drawing after a naked body, all the muſcles are not to be ſo plainly expreſſed as in anatomical figures; but that ſide whoſe parts are moſt apparent, and of ſignification in the performance of any action, muſt be made to appear more or leſs, according to the force of that action.

7. In drawing young perſons, the muſcles muſt not appear manifeſtly ſo hard, as in elder and full grown perſons: the ſame is to be obſerved as to fat and fleſhy perſons, and ſuch as are very delicate and beautiful; and in women, ſcarce any muſcles at all are to be expreſſed, or but very little, unleſs it be in ſome very terrible action, and then too they are to be repreſented very faintly; the like is alſo to be obſerved as to little children.

8. The motion of the whole body muſt be conſidered in drawing of the muſcles; as in the riſing and falling of the arms, the muſcles of the breaſt do appear more or leſs; the hips do the like, according as they are bent outward or inward; and it is the ſame chiefly in the

ſhoulders,

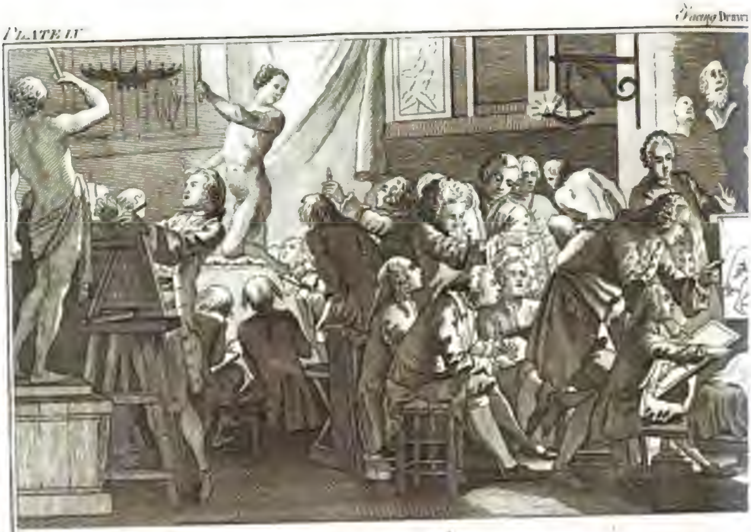
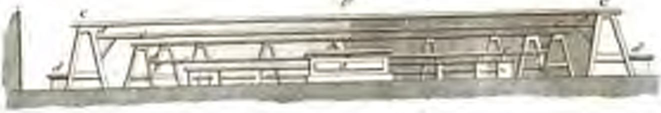
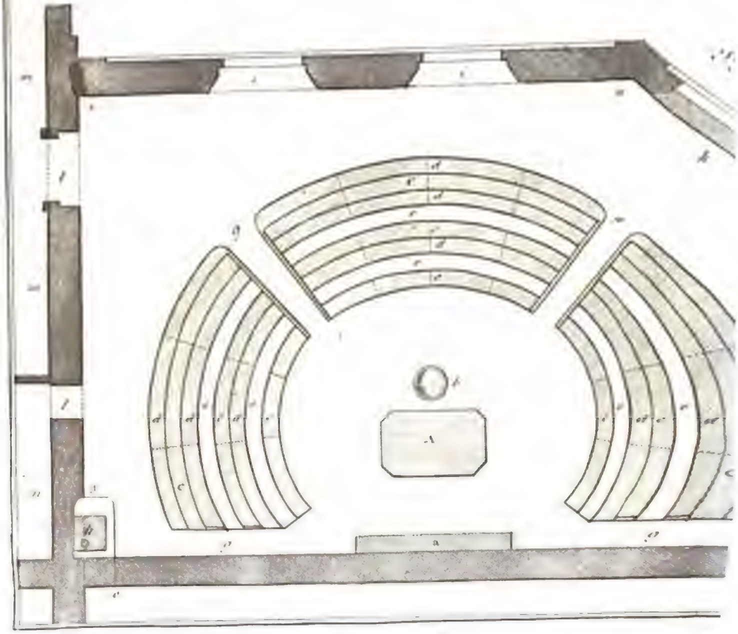


Fig. 2

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ſhoulders, ſides, and neck, according to the ſeveral actions of the body.

9. The proportion of the figure ought to be multiplied by degrees, in proportion of one to two, three, four, &c. for herein the chief ſkill conſiſts: the diameter of the biggeſt place, between the knee and the foot, is double to the leaſt, and the largeſt part of the thigh, triple.

Drawing-School, an apartment, or rather an academy where youth are taught the arts of drawing and deſign.

Explanation of plate LV. repreſenting a drawing-ſchool, its plan and profile.

Upper Compartment.

This is a perſpective view of a drawing ſchool. On the right hand the ſcholars are repreſented as copying deſigns, with their maſters inſtructing them. On the left are others drawing, from the life, two figures, one a living ſubject placed on a ſtool, the other a model, ſet upon a table, and both enlightened by a lamp ſuſpended above.

Lower Compartment.

Fig. 1. is a plan of the above drawing-ſchool.

A, the table on which the model is placed.

b, a tub filled with water for receiving the oil that drops from the lamp ſuſpended above.

c, *c*, *c*, *c*, *c*, *&c.* benches placed on treſſels for the deſigners.

c, *c*, *c*, benches for the modellers, or thoſe that model after nature.

d, *d*, ſeats for the ſcholars.

e, *e*, *e*, intervals between the benches.

f, a bench for thoſe that deſign, with a reflected light.

g, *g*, *g*, paſſages.

h, the ſtove.

i, *i*, tranſum windows for deſigning in the day-time.

l, *l*, *l*, *l*, doors.

m, veſtibule.

n, cabinet.

o, *o*, a room for other exerciſes.

Fig. 2. Profile of the benches.

A, the table.

a, its foot or ſtand, on which it turns in any direction, for ſhewing the model, after it is ſet, to the greateſt advantage.

c, *c*, the benches.

C, the bench for the modellers.

d, *d*, *d*, *d*, ſeats.

Drawing-Medicines, thoſe more uſually called epiſpaſtics and ripeners.

Drawing, among ſportſmen, the beating the buſhes after a fox.

Fine **Drawing**, among taylors, the art of ſewing up button-holes, or any rents in cloth, in ſo nice a manner, as that they cannot be diſcovered from the entire part of the cloth.

DRAY, a kind of cart uſed by brewers for carrying barrels of beer or ale; alſo a ſledge drawn without wheels.

Dray, among ſportſmen, denotes ſquirrel-neſts built in the tops of trees.

DREIN, in the military art, a trench made to draw the water out of a moat, which is afterwards filled with hurdles and earth, or with faſcines, or bundles of ruſhes and planks, to facilitate the paſſage over the mud. See Trench.

DRENCH, among farriers, a phyſical potion for horſes. The ingredients for this purpoſe are to be beat coarſely, and either mingled with a decoction, or with wine. Then infuſe it all about a quarter of an hour, and give it to the horſe with a horn, after he has been tied up two hours to the rack.

DRESSING *of Hemp and Flax*. See Hemp and Flax.

Dressing *of Ores*, the preparing them, as they come rough from the mine, for the working by fire. This is done ſeveral ways in different countries, and in reſpect to the different ores of different metals. In Devonſhire they have a very eaſy method, which is ſo expeditious, and ſo good for all the purpoſes, that it is worthy copying in other places. After the ore is dug, it is toſſed up by hand from ſhamble to ſhamble by the ſhovel men in the mine, and drawn up in buckets by a winch at the top of a ſhaft. As ſoon as the whole quantity for one dreſſing is brought up, the large ſtones are broken, and the whole is then carried to the mills, where one horſe turns a wheel that moves the machines for powdering a great quantity of it; theſe are called the ſtamping or knocking mills. The ore is unloaded at the head of the paſs or entrance into theſe mills; this paſs is made of two or three bottom boards, and two ſide boards, in form of a hollow trough, and ſtands in a ſlanting direction. The ore by its own weight is carried down this trough, and lodges itſelf in the coffer. The coffer is a long ſquare box made of the firmeſt timber, and of three feet long, and a foot and a half broad: the ore is not ſuffered to fall into this all at once, but is ſtopped over the mouth of the trough by a croſs board, where a cock turns in a quantity of water at the ſame time, which waſhes down juſt as much of the ore with it into the trough as there ought to be. In this coffer there are three lifters placed between two ſtrong board leaves, having two braces or thwart pieces on each ſide to keep them ſteady, and a frame with ſtamp heads. Theſe heads are of iron, and weigh about thirty or forty pounds a-piece, and ſerve to break the lumps of ore in the coffer.

The lifters are about eight feet long, and half a foot ſquare. They are always made of heart of oak, and have as many timbers or guiders between them; they are lifted up in order, by a double number of toppits, which are faſtened to as many arms paſſing diametrically through the greateſt beam, which is either turned by the wheel and horſe, or where there is conveniency of water, by an over-ſhot water-wheel on two boulters. The toppits exactly, but eaſily, meet with the tongues, which are ſo placed in the lifters, as that they eaſily ſlide from each other, and ſuffer the lifters to fall with great force on the ore in the trough. The frequent pounding of theſe ſoon reduces the large maſſes into a ſort of ſand, which is waſhed out of the trough by the continual current of the water from the cock through a braſs grate, placed at one end of the coffer between two iron bars.

The powdered ore is conveyed out of the trough into the launder, which is a trench cut in the flour of eight feet long, and ten feet over; this is ſtopped at the lower end with turf, ſo that the water is all ſuffered to paſs away, and the powder of the ore is ſtopped. Thus the launder by degrees fills up with the dreſſed ore; and this is removed out with ſhovels, as occaſion requires. The launder is divided into three parts, the forehead, the middle, and the tail; that ore which lies in the forehead, that is, within a foot and a half of the grate, is always the richeſt and beſt, and is laid up in a heap by itſelf; the middle and tail afford a poorer ore; and theſe are ſometimes laid up in ſeparate heaps; ſometimes thrown into one heap together.

Dressing, in ſurgery, the treatment of a wound or any diſordered part. The apparatus of dreſſing conſiſts of doſſils, tents, plaſters, compreſſes, bandages, bands, ligatures, and ſtrings.

DRIFT *of the Foreſt* is an exact view and examination taken at certain times to know what beaſts are there; in order that none may come on the foreſt but ſuch as have right; and that the foreſt be not overcharged with beaſts.

Drift, in mining, a paſſage cut out under the earth, betwixt ſhaft and ſhaft, or turn and turn; or a paſſage or way, wrought under the earth, to the end of a meer of ground, or part of a meer.

Drift, in navigation, the line upon which a ſhip drives in a ſtorm with her ſide to the wind, when it blows ſo violent as to prevent her from being able to carry any ſail, or only ſufficient to keep her ſufficiently inclined to one ſide, that ſhe may not carry away her maſts by violent rocking: or, drift is the angle which the line of her motion makes with the keel in ſuch a ſituation when her prow is in the middle between the points of the compaſs, to which ſhe comes up and falls. See the article Trying.

DRILL, in mechanics, a ſmall inſtrument for making ſuch holes as punches will not conveniently ſerve for. Drills are of various ſizes, and are chiefly uſed by ſmiths and turners.

Drill, or **Drill-Box**, a name given to an inſtrument

ment for ſowing land in the new method of horſe-hoeing huſbandry. It plants the corn in rows, makes the channels, ſows the ſeeds in them, and covers them with earth when ſown; and all this at the ſame time, and with great expedition. The principal parts are the ſeed-box, the hopper, the plough and its harrow, of all which the ſeed-box is the chief. It meaſures, or rather numbers, out the ſeed, which it receives from the hopper, and is for this purpoſe an artificial hand; but it delivers out the ſeed much more equally than can be done by a natural hand. See the article PLOUGH.

DRINK, a part of our ordinary food in a liquid form, ſerving to dilute and moiſten the dry meat. See the article DIET.

The drinks in different countries are different. The common drink in England is either water, malt liquor, wine, or mixtures of theſe.

The firſt drinks of mankind were certainly water and milk, but the love of luxury and debauchery ſoon introduced the art of preparing intoxicating and inebriating drinks out of vegetables.

Of all kinds, water is the leaſt flatulent, becauſe the unelaſtic air lodged in it, cannot be extricated by the heat of the body, ſo as to become elaſtic. The moſt flatulent of all drinks are thoſe taken in the act of fermentation, as for example, the ale which is cloſe ſhut up in very ſtrong bottles, and flies out with the greateſt force upon opening them; for by an imprudent uſe of ſuch, the moſt ſevere cholic, iliac paſſion, and cholera morbus, frequently enſue. Next to theſe come ſuch drinks as have not yet fermented, but are ſoon ſet to work by the heat of the body; as for example, muſt, new wine, or ale, wherein no bitter herbs, ſuch as hops, wormwood, &c. have been boiled as a preſervative.

Dr. Bryan Robinſon thinks that the proportion of meat to drink, ought to be ſuch as ſhall make perſpiration and urine nearly equal at all ſeaſons of the year.

DRIPS, in architecture. See the article LARMIER.

DRIVER, in naval affairs, an oblong ſail hoiſted occaſionally to the mizen-peek when the wind is very fair; the lower corners of it are extended by a boom or pole, which is thruſt out a-croſs the ſhip over the quarter. See MIZEN and QUARTER.

DRIVERS, among ſportſmen, a machine for driving pheaſant-powts, conſiſting of good ſtrong ozier-wands, ſuch as the baſket-makers uſe; theſe are to be ſet in an handle, and twiſted or bound with ſmall oziers in two or three places.

With this inſtrument the ſportſman drives whole eyes of young powts into his nets.

DRIVING, among ſportſmen, a method of taking pheaſant-powts. It is thus performed: the ſportſman finds out the haunts of theſe birds; and having fixed his nets there, he calls them together by a pheaſant-call, imitating the voice of the dam: after this he makes a noiſe with his driver, which will make them run a little way forward in a cluſter; and this he is to repeat till he has made ſure of them, which an expert ſportſman never fails to do, by driving them into his nets.

DRIVING, in metallurgy, is ſaid of ſilver, when in the operation of refining, the lead being burnt away, the remaining copper riſes upon its ſurface in red fiery bubbles. See the article SILVER.

DROCK, in huſbandry, the upright piece of timber on the right ſide of a plough's tail, to which is fixed the earth board. See PLOUGH.

DROMEDARY, *Dromedarius*, a large animal of the camel-kind, with only one bunch on its back: it is taller than the horſe, and has a much longer and ſlender neck: its ears are ſhort, and the upper lip is divided in the manner of that of the hare. It is a native of Aſia, and more uſed for riding on, than for carrying heavy loads.

DROMEUS, a name given by the ancients to two very diſtinct animals, the ſtag and dromedary.

DRONE, in the hiſtory of inſects, a kind of male bee, larger than the common working or honey-bees: it is ſo called from its idleneſs, as never going abroad to collect either honey or wax. See BEE.

DRONE-FLY, a two winged inſect, extremely like the common drone-bee, whence alſo the name.

DROPS, in rchitecture, an ornament in the Doric entablature, repreſenting drops, or little bells, immediately under the triglyphs.

DROPSY, in medicine, a preternatural collection of extravaſated aqueous ſerum, which greatly diſtends the veſſels in any part of the body.

This diſeaſe may therefore happen in whatever part the veſſels deſtined for the conveyance of the ſerum are found; that is, either in the whole habit of the body, or in any particular part thereof.

Thus a dropſy may ariſe from a ſordid collection of water, either between the external integuments of the head; between theſe and the cranium; between the cranium and the membranes of the brain; between theſe membranes and the duplicatures; between theſe duplicatures and the brain; between the foldings of the brain; and, laſtly, in its cavities, but yet without producing immediate death.

This diſorder is eaſily known, but the laſt-mentioned ſpecies of it is incurable; whereas the others are either to be cured by gentle cauterizing, terebration, or puncture, prudently and cautiouſly practiſed; exhibiting, at the ſame time, hydragogues and corroboratives, internally; or they are to be removed by the external application of diſcutients.

In a dropſy of the thorax, in which the lymph may be collected from various parts, the ſymptoms are almoſt the ſame with thoſe of an empyema: but a due attention to the antecedent cauſes of each diſorder diſcovers the differences between them. This is to be cured by the operation for the empyema, together with the due uſe of ſuch medicines as are oppoſite to its cauſe.

In a dropſy of the thorax, ſometimes hydatides, and ſometimes dropſical abſceſſes, are found formed in the lungs, by an accumulation of the lymph diſcharged from the veſſels, and received into the large ſinuſes. This ſpecies of the diſorder is equally difficult to be known and cured, unleſs, perhaps, the meaſures taken to remove other preſent ſymptoms ſhould, at the ſame time, fortuitouſly produce a cure of this ſpecies of dropſy.

When, by whatever cauſe, lymph is collected, and becomes ſtagnant, in the anterior and moſt conſpicuous part of the aſpera arteria, a ſpecies of bronchocele often appears. But authors inform us, that if this diſorder is carefully adverted to, it is eaſily known, and moſt ſucceſsfully cured by puncture, diſcutients, and ſuch things as derive the humours from the parts affected.

The follicule of any gland may be ſubjected to the like misfortune, and the diſorder removed by the like means.

A remarkable ſpecies of the dropſy ſometimes affects the ovaria of women, but moſt frequently of thoſe who are barren and ſuperannuated. This diſorder is of ſo latent a nature, that it is hardly to be known, till the body of the patient is laid open. It is never capable of being cured, but frequently changes into an aſcites.

In the cavity of the uterus, when its external orifice is cloſed up, there is often ſo large a quantity of water collected, that the whole abdomen appears as if the patient laboured under an aſcites. This ſpecies of diſorder is, in like manner, not to be known without the greateſt difficulty, by reaſon of the fallacious ſigns of pregnancy, with which it is attended. It is to be cured by a relaxation of the orifice of the uterus, by means of fomentations, vapours, and the due uſe of uterine medicines.

When through the whole ſubcutaneous fat this lymph either becomes ſtagnant, or is effuſed, that ſpecies of dropſy which is called anaſarca, hypoſarca, and leucophlegmatia, is produced; which ſometimes affects the parts about the abdomen, and thoſe about the ſcrotum.

When this water is collected either in the duplicature of the peritonæum, in the cavity of the abdomen, between the peritonæum and abdominal viſcera, in the dilated cavities of the glands, or in the veſſels contained in the abdomen, the diſorder is called aſcites; as alſo tympanites, when the abdomen is turgid with rarefied vapours, ariſing either from water, pus, ichor, or air pent up there, and putrefied by the heat.

A dropſy of the teſticles is, firſt, either that of the ſcrotum, which is known by the touch, the conſpicuous pellucidity of the parts, and the remaining of an impreſſion made by the finger; or, ſecondly, of the bag, formed by the production of the peritonæum in a legitimate hernia. This ſpecies of the diſorder happens in a violent aſcites; and may be diſtinguiſhed by the preceding ſigns of an aſcites, or a tympanites; or by its diſappearance, upon its being preſſed, upon the patient's lying on his back, with his head and body lower than the other parts, and upon the evacuation of the water from the abdomen; by the ſudden increaſe and decreaſe of the diſorder, without any manifeſt cauſes; and, laſtly, by the tumor running out from the ſcrotum to the groin in the form of a hog's pudding. And, thirdly, a dropſy of the tunica vaginalis of the teſticles happens, when the humours there ſecreted are not abſorbed by their proper veſſels, but, becoming ſtagnant, are accumulated, and frequently diſtend the coat in which they are contained to an enormous ſize; or if, in conſequence of a rupture, or obſtructions of the veſſels, the humours ſhould be there collected: an inflammation, ſuppuration, and collection of ichor, often produce a diſorder, which has much the ſame appearance as a ſpecies of dropſy; this ſort of dropſy is to be known and diſtinguiſhed by the want of elaſticity in the tumor, its reſiſtance, its hardneſs, and the ſlowneſs of its production; as alſo by the abſence of thoſe ſymptoms which attend the firſt and ſecond ſpecies of dropſies of the teſticles; by the round, or, at leaſt, the oval figure of the tumor; by the apparent pellucidity, when, upon ſtraightening the ſcrotum, the bag of collected matter, expoſed to a lighted candle, appears clear and tranſparent. But if, beſides theſe, there ſhould be ſuch a tumor between the nervous coat and the ſubſtance of the teſticle, the diſorder can hardly be ſo accurately inſpected, as that it may be eaſily diſtinguiſhed from the preceding ſpecies, nor perhaps is there any other cure for it than extirpation. The diſorders of this kind are called hydroceles. See HYDROCELE.

All the diſorders of this kind are produced, firſt, by every cauſe which is capable of ſo confining the ſerum, that it cannot return into the veins, but ſtagnates in the diſtended veſſels; or, ſecondly, by every cauſe which ſo ruptures the veſſels, that the ſerum is diſcharged within the ſlender membranes; or, thirdly, by every cauſe which ſo obſtructs the veſſels which convey the fluids from the cavities, or ſo little moves the humours contained in them, that they are neither exhaled nor re-abſorbed.

The cauſes of this kind are principally obſerved to be an hereditary and natural diſpoſition; the ſudden drinking of too large quantities of cold liquors, which are neither diſcharged by vomit, ſtool, ſweat, nor urine, excited by heat or motion; acute diſeaſes, either accompanied with an inſatiable thirſt, or exceſſive drinking, or without theſe circumſtances; a lienteric dyſentery long protracted; quartan fevers; lienterics; diarrhœas; dyſenteries of long ſtanding; the cœliac paſſion; empyemas; a ſpitting of blood; the gout; exceſſive evacuations of any kind, and eſpecially of the arterial blood; drinking of acrid and fermenting liquors; viſcid aliments, and ſuch as are of difficult digeſtion; a conſiderable number of large hydatides hanging pendulous in the cavity of the abdomen; and many other diſorders of a ſimilar nature, ſuch as melancholy, the ſcurvy, and ſome others.

The effects and progreſs of this diſeaſe are generally as follows: the feet become tumid, eſpecially towards the evening; and this tumor is gradually increaſed and augmented; then a daily increaſing tumor appears in the abdomen. In a tympanites the diſtended abdomen ſounds when ſtruck; in an aſcites, when the water flows freely in the cavity of the abdomen, the noiſe of fluctuating water is heard upon moving the body: but in that ſpecies of aſcites, where the waters are included in their proper veſicles, this ſymptom does not always happen, and conſequently is not to be depended on. Add to theſe a difficulty of breathing, thirſt, a ſenſation of weight, torpor, coſtiveneſs; a ſmall diſcharge of urine, a ſlow fever, no evacuation by ſweat, a degree of leanneſs and extenuation in the general habit, proportioned to the largeneſs of the tumor, in the particular part affected: then appears an anaſarca of the thighs, ſcrotum, and abdominal ſkin; hydatides; an acrimony of the water, become ſtagnant and putrefied, in conſequence of the heat and cloſeneſs of the part in which it is confined; ulcers, gangrenes; hæmorrhages from the noſe, an exomphalus, a ſphacelus of the viſcera, and at laſt the death of the patient.

In the cure of a dropſy the following intentions are to be purſued.

Firſt, to produce a due fluidity, and motion to the lymph, whether it is water or ſerum, of the bilious, ichorous, or bloody kind.

Secondly, to evacuate the waters already diſcharged into the cavities of the body.

Thirdly, to remove the weakneſs of the viſcera, whether this weakneſs is the cauſe or the effect of the dropſy.

The fluidity of the lymph is procured, by removing thoſe cauſes which prevent ſuch a fluidity; which are, firſt, the too languid force of the vital powers ſubſervient to circulation; ſecondly, the compreſſion, rupture, or obſtruction of the veſſels; and, thirdly, the exceſſive or preternatural viſcidity of the fluids.

With reſpect to the too languid force of the vital powers ſubſervient to circulation, this is moſt commodiouſly removed by cardiacs, corroboratives, and medicines of a ſtimulating quality, which, if the patient is not afflicted with a violent thirſt, are to conſiſt of aromatic, ſaline, oleous, and hot ſubſtances; which may be eaſily prepared in the various forms of electuaries, mixtures, medicated wines, medicated ales, pills, decoctions, ſyrups, or lozenges. *Boerhaave.*

DROP-WORT, in botany, the ſame with the filipendula. See the article FILIPENDULA.

DROSERA, ſun-dew, in botany, a genus of plants, with a funnel faſhioned flower, conſiſting of five obtuſely-ovated petals: the fruit is an unilocular, ſuboval capſule, containing a great many very ſmall ſeeds.

DROWNING, the act of ſuffocating, or being ſuffocated, by water.

Naturaliſts and phyſicians furniſh us with divers well atteſted inſtances of ſurpriſing recoveries of perſons drowned. It is certain from repeated diſſections made on perſons drowned, that they generally have leſs water in their ſtomachs than if they had voluntarily drank a conſiderable quantity: whence it does not ſeem expedient to hang the drowned perſon by the heels, a poſition that muſt prove uneaſy as ſoon as the humours of the body ſhould reſume their ordinary motion. In order to know whether the perſon has ſwallowed too much water, or not, and to make him vomit it up if he has, it is proper to put him in a tun open at both ends, which is to be rolled in different directions; or the bearded end of a feather ſhould be introduced into the œſophagus. After taking off the cloaths of the drowned perſon, we ought, with the utmoſt expedition, to ſhelter him from the impreſſions of the cold air, and begin to warm him by wrapping him up with cloaths and coverings: to do this more effectually, he is afterwards to be put into a pretty warm bed, applying alſo to his body hot napkins and cloths. A hot ſcorching ſun, to which drowned perſons have been expoſed, and hot baths, have produced the ſame happy effects.

The great intention to be purſued is to put the ſolid parts of the machine in action, that thus they may reſtore the motion of the fluids; in order to this, the drowned perſon ſhould be agitated in various directions, in a bed, in the arms of perſons of ſufficient ſtrength.

Spirituous liquors or warm urine ſhould be poured into his mouth, and ſome perſons preſcribe a decoction of pepper and vinegar, as a gargariſm; we muſt alſo attempt to irritate the internal fibres of the noſe, either by volatile ſpirits, and by the liquors uſed in apoplectic caſes; or by tickling the nerves of the noſtrils with a bearded feather, or by blowing through a quill, ſnuff, or ſome other more powerful ſternutatory. One of the means frequently uſed with ſucceſs, is to blow warm air, by means of a pipe, into their mouths; or to introduce it by a pair of bellows; or, by injecting warm clyſters, to irritate the inteſtines: the ſmoke of tobacco conveyed into the inteſtines, by means of a tobacco-pipe, is much recommended. Venæſection is by no means to be neglected; and perhaps moſt ſucceſsfully in the jugular vein; and when all theſe meaſures prove unſucceſsful, the laſt recourſe is bronchotomy. See the article BRONCHONOMY.

DRUG, a general term for goods of the druggiſt and grocery kinds, eſpecially for thoſe uſed in medicine and dying.

DRUGGET, in commerce, a ſtuff ſometimes all wool, and ſometimes half wool and half thread, ſometimes corded, but uſually plain.

DRUIDS, the prieſts among the ancient Britons and Gauls.

The word is formed from the Celtic, *deru*, an oak; becauſe they held that tree in the higheſt veneration.

Their antiquity is eſteemed equal to that of the Brachmans of India, the Magi of Perſia, and the Chaldees of Babylon. And whoever conſiders the ſurpriſing conformity of their doctrine, will find ſufficient reaſon to think that they all derived it from the ſame hand, we mean from Noah and his immediate deſcendants, who carried it with them at their diſperſion; for it cannot be ſuppoſed that the Britiſh druids derived their doctrine from any foreign ſect, to whom they were abſolutely unknown.

But the druids were not contented with the power annexed to the prieſthood; they introduced religion into every tranſaction both public and private, ſo that nothing could be done without their approbation; and by this means their authority was rendered almoſt abſolute. They elected the annual magiſtrates of every diſtrict, who ſhould have enjoyed, during that term, the ſupreme authority, and ſometimes the title of kings; but they could not even call a council without their approbation and advice: ſo that, notwithſtanding their pretended authority, they were in reality the creatures and ſlaves of the druids.

They exerciſed the ſame arbitrary power in their courts of juſtice; and whoever refuſed to ſubmit to their deciſions, were excluded from the public ſacrifices, which was conſidered as the greateſt puniſhment that could be inflicted. It muſt however be acknowledged, that their adminiſtration of juſtice has always been celebrated for its impartiality. The ſole management and inſtruction of youth was alſo committed to them, except the training them up in the art of war; for both they and their diſciples were not only exempted from going to war, but likewiſe from all kind of tribute.

Their garments were remarkably long; and, when employed in religious ceremonies, they always wore a white ſurplice. They generally carried a wand in their hands, and wore a kind of ornament enchaſed in gold about their necks, called the druid's egg. Their necks were likewiſe decorated with gold chains, and their hands and arms with bracelets: they wore their hair very ſhort, and their beards remarkably long.

They were all ſubordinate to a chief or ſovereign pontiff, ſtiled the arch-druid, choſen from among their fraternity by a plurality of voices; but, in caſe of a competition too powerful to be decided by a majority, the conteſt was determined by the ſword. He enjoyed his ſupremacy for life, had power to inſpect the conduct of kings, and either to elect or depoſe whenever he pleaſed.

It was one of the maxims of their religion, not to commit any thing to writing; but deliver all their myſteries and learning in verſes compoſed for that purpoſe; and theſe were in time multiplied to ſuch a number, that it generally took up twenty years to learn them all by heart. By this means their doctrines appeared more myſterious by being unknown to all but themſelves; and having no books to recur to, they were the more careful to fix them in their memory.

But what had ſtill a more direct tendency to impoſe on the public, was their pretended familiar intercourſe with the gods. And, in order to conceal at once their own ignorance, and render the impoſition leſs ſuſceptible of detection, they boaſted of their great ſkill in magic, and cultivated ſeveral branches of the mathematics, particularly aſtronomy. The latter they carried to ſome degree of perfection; for they were able to foretel the times, quantities, and durations of eclipſes; a circumſtance which could not fail of attracting reverence from an ignorant multitude, who were perſuaded that nothing leſs than a ſupernatural power was ſufficient to make ſuch aſtoniſhing predictions: they alſo ſtudied natural philoſophy, and practiſed phyſic.

Before we conclude this account of the druids, we muſt obſerve, that the fair-ſex enjoyed a part of the prieſthood; and were conſidered as endowed with the ſpirit of prophecy. They aſſiſted the druids at their religious functions; and ſome of them became very famous for the great progreſs they made in different branches of learning.

The next order in great eſteem among them, was that of the bards. Some writers indeed have confounded theſe with the druids, but this is a miſtake; they had their name from their office, which was to chant hymns in concert at their periodical feſtivals, and celebrate the praiſes of their heroes. Theſe ſongs were accompanied with muſical inſtruments, and conſidered as the dictates of their gods; ſo that it is no wonder the bards were held in the higheſt eſteem. It is even ſaid, that they could at any time put a ſtop to a whole army's engaging by their interpoſition: ſo great was the power of the muſes over a barbarous multitude!

They worſhipped the Supreme Being under the name of Eſus, or Heſus, and the ſymbol of the oak; and had no other temple than a wood or grove, where all their religious rites were performed. Nor was any perſon admitted to enter that ſacred receſs, unleſs he carried with him a chain, in token of his abſolute dependence on the Deity. Indeed, their whole religion originally conſiſted in acknowledging that the Supreme Being, who made his abode in theſe ſacred groves, governed the univerſe, and that every creature ought to obey his laws, and pay him divine homage.

They conſidered the oak as the emblem, or rather the peculiar reſidence of the Almighty; and accordingly chaplets of it were worn both by the druids and people in their religious ceremonies, the altars were ſtrewed with its leaves, and encircled with its branches. The fruit of it, eſpecially the miſletoe, was thought to contain a divine virtue, and to be the peculiar gift of heaven. It was therefore ſought for on the ſixth day of the moon with the greateſt earneſtneſs and anxiety, and when found was hailed with ſuch raptures of joy, as almoſt exceeds imagination to conceive.

As ſoon as the druids were informed of this fortunate diſcovery, they prepared every thing ready for the ſacrifice under the oak, to which they faſtened two white bulls by the horns: then the arch-druid, attended by a prodigious multitude of people, aſcended the tree, dreſſed in white, and with a conſecrated golden knife, or pruning-hook, cropped the miſletoe, which he received in his ſagum or robe, amidſt the rapturous exclamations of the people. Having ſecured this ſacred plant, he deſcended the tree, the bulls were ſacrificed, and the Deity invoked to bleſs his own gift, and render it efficacious in thoſe diſtempers in which it ſhould be adminiſtered.

The conſecrated groves, in which they performed their religious rites, were fenced round with ſtones, to prevent any perſon's entering between the trees, except through the paſſages left open for that purpoſe, and which were guarded by ſome inferior druids, to prevent any ſtranger from intruding into their myſteries. Theſe groves were of different forms, ſome quite circular, others oblong, and more or leſs capacious, as the numbers of votaries in the diſtricts to which they belonged, were more or leſs numerous. The area in the center of the grove was encompaſſed with ſeveral rows of large oaks ſet very cloſe together. Within this large circle were ſeveral ſmaller ones ſurrounded with large ſtones; and near the center of theſe ſmaller circles, were ſtones of a prodigious ſize, and convenient height, on which the victims were ſlain, and offered. Each of theſe being a kind of altar, was ſurrounded with another row of ſtones, the uſe of which cannot now be known, unleſs they were intended as cinctures to keep the people at a convenient diſtance from the officiating prieſt. Nor is it unreaſonable to ſuppoſe, that they had other groves appointed for ſecular purpoſes, and perhaps planted with oaks as the others were, that the ſacred trees might ſtrike the members of ſuch courts and councils with awe, and prevent all quarrels and indecent expreſſions.

While the religion of the druids continued pure and unmixed with any foreign cuſtoms, they offered only oblations of fine flour ſprinkled with ſalt, and adored the Supreme Being in prayers and thankſgivings. But after they had for ſome time carried on a commerce with the Phœnicians, they loſt their original ſimplicity, adored a variety of gods, adopted the barbarous cuſtom of offering human victims, and even improved on the cruelty of other nations; uſing theſe unfortunate mortals for the purpoſes of divination, with ſuch barbarous cruelty as is ſhocking to human nature to relate. Practices like theſe ſoon rendered them ſo deaf to the voice of humanity, that on extraordinary occaſions they erected a monſtrous hollow pile of oſier, which they filled with theſe unhappy wretches, and burnt them to their gods. Criminals were indeed choſen for this barbarous ſacrifice; but in want of theſe, the innocent became victims of a cruel ſuperſtition.

We have already mentioned, that in their ſacred groves were ſeveral large ſtones, ſuppoſed to be the altars on which they offered their victims. Some of theſe ſtones are ſtill remaining in England, Wales, Ireland, and the iſland of Angleſey; and are of ſuch an amazing magnitude, that the bringing and rearing them was thought by the ſuperſtitious to have been the work of thoſe dæmons ſuppoſed to attend on that manner of worſhip.

Temples they had none before the coming of the Romans, nor in all probability for a long time after: for with regard to thoſe vaſt piles of ſtones ſtill remaining, they ſeem rather to have been funeral monuments than places of worſhip; eſpecially as all the ancient writers agree that their religious ceremonies were always performed in their conſecrated groves. Accordingly Tacitus, ſpeaking of the deſcent of the Romans, tells us, that their firſt care was to deſtroy thoſe groves and woods which had been polluted with the blood of ſo many human victims.

One of the chief tenets taught by the druids was the immortality of the ſoul, and its tranſmigration from one body to another; a doctrine which they conſidered as proper to inſpire them with courage, and a contempt of death. They alſo inſtructed their diſciples in ſeveral traditions concerning the ſtars and their motions, the extent of the world, the nature of things, and the power of the immortal gods. But as they never committed any of their tenets to writing, in order at once to conceal their myſterious learning from the vulgar, and exerciſe the minds of their diſciples, the greateſt part of them are now irrecoverably buried in the lake of oblivion.

DRUM, *Tympanum*, is a martial muſical inſtrument in form of a cylinder, hollow within, and covered at the two ends with vellum, which is ſtretched or ſlackened at pleaſure by the means of ſmall cords and ſliding knots.

Kettle DRUMS, are two ſorts of large baſons of copper or braſs, rounded in the bottom, and covered with vellum or goat-ſkin, which is kept faſt by a circle of iron, and ſeveral holes faſtened to the body of the drum, and a like number of ſcrews to ſcrew up and down. They are much uſed among the horſe, as alſo in operas, oratorios, concerts, &c.

DRUM, or DRUMMER, he that beats the drum, of whom each company of foot has one, and ſometimes two. Every regiment has a drum-major, who has the command over the other drums.

DRUM *of the Ear*, in anatomy. See TYMPANUM.

DRUM, in architecture. See TAMBOUR.

DRUNKENNESS, *Ebrietas*, phyſically conſidered, conſiſts in a preternatural compreſſion of the brain, and a diſcompoſure of its fibres, occaſioned by the fumes or ſpirituous parts of liquors.

DRUPE, among botaniſts, a kind of pericarpium, conſiſting of a ſoft, fleſhy, and ſucculent pulp, with a nucleus, or kernel in its center.

DRY MEAT, in the manege, is uſed for corn and hay. After taking the horſe from graſs he is houſed, and put to dry meat

DRYADS, *Dryades*, in the heathen theology, a ſort of deities, or nymphs, which the ancients thought inhabited groves and woods. They differed from the Hamadryades, theſe latter being attached to ſome particular tree, with which they were born, and with which they died; whereas the Dryades were goddeſſes of trees and woods in general.

DUBLIN, the capital of the province of Leinſter, and of all Ireland, ſituated at the mouth of the river Liffee, 60 miles weſt of Holyhead in Wales: weſt long. 6 deg. 25 min. north lat. 53 deg. 16 min.

It is a large and beautiful city, pleaſantly ſituated; having a view of the ſea on one ſide, and of a fine country on the other. It is the ſeat of the courts of juſtice, and an archbiſhop's ſee; and has a noble college, which is an univerſity of itſelf.

DUCAL, in general, ſomething belonging to a duke. See the article DUKE.

DUCAL CROWN, or CORONET. See the article CROWN.

DUCAT, a coin current in Germany and other countries abroad, for the different values of which ſee EXCHANGE.

DUCATOON, a ſilver coin, likewiſe frequent in ſeveral parts of Europe.

DUCK, *Anas*, in ornithology, a genus of birds ſufficiently known.

There are two ſorts of ducks common in England, the tame and wild; the firſt of which is very beneficial to huſbandmen, and at the ſame time requires no charge to keep, living on loſt corn, worms, ſnails, &c. Indeed once a year this fowl is a great layer of eggs; and when ſhe ſits, muſt be carefully fed with barley or other grain. As to the ducklings, they are fed in the ſame manner as goſlings, and may be fattened in three weeks time, by giving them any kind of pulſe or grain, and plenty of water.

DUCT, or DUCTUS, in general, denotes any tube or canal.

It is much uſed by anatomiſts, who mention the adipoſe ducts, concerning the reality of which authors are not agreed; the thoracic, or chyliferous duct; the excretory ducts of the glands; the hepatic duct, or porus bilarius; the ſalival ducts; the lachrymal ducts; the ductus communis choledochus, &c. concerning all which it is to be obſerved, that their uſe is to convey certain animal fluids ſecreted in the glands of the parts to which they ſeverally belong: thus it is, the ſalival ducts diſcharge the ſaliva, or pellucid liquor, ſecreted in the glands of the mouths; and ſo of the reſt.

DUCTILITY, in phyſics, a property of certain bodies, whereby they are capable of being expanded, or ſtretched forth, by means of a hammer, preſs, &c.

The vaſt ductility of ſome bodies, eſpecially gold, is very ſurpriſing. See DIVISIBILITY.

DUEL is a ſingle combat, at a time and place appointed, in conſequence of a cartel or challenge.

The word is derived from the Latin, *duellum, quaſi duorum bellum*, a combat between two perſons.

Authorized duels were ſuch whoſe motive was the good of their country, when one, or a ſmall number of combatants were choſen to ſave the blood of a whole army, and decide, by victory or death, the quarrels of kings or whole nations. Thus Goliath and David, the Horatii and Curiatii, and ſeveral others.

Duelling was ſo general a method of determining differences among the nobles, that even eccleſiaſtics were not excuſed; only, to prevent their being ſtained with blood, they procured champions to fight for them. None were excepted from combat, but ſick people, cripples, and ſuch as were under twenty-one years of age, or above ſixty. Juſts and tournaments, doubtleſs, rendered duels more frequent.

We have good proof that duelling was authorized before the Normans came into England, though not ſo frequent and ſolemn as after the Conqueſt. Theſe are however now known no longer, and we could wiſh the private practice of duelling was alſo buried in oblivion.

DUKE is either the title of a ſovereign prince, as the duke of Savoy, Parma, &c. the grand duke of Tuſcany, Muſcovy, &c. or it is the title of honour and nobility next below princes.

DULCIFYING, in pharmacy, is the ſweetening, or rendering inſipid, any matter impregnated with ſalts, by waſhing it in pure water.

The word is formed from the Latin, *dulcis*, ſweet, and *facio*, to make.

DULEDGE, in gunnery, a peg of wood which joins the ends of the ſix felloes that form the round of a wheel of a gun carriage. The plate of iron on the outſide of the wheel, which ſtrengthens the joint, is called the duledge plate.

DUNG, in agriculture, is of ſeveral ſorts, as that of horſes, cows, ſheep, hogs, pigeons, geeſe, hens, &c. All kinds of dung contain ſome matter, which, when mixed with the ſoil, ferments therein, and, by that fermentation, diſſolves the texture of the earth, and divides and crumbles its particles very much. This is the real uſe of dung in agriculture; for as to the pure earthy part of it, the quantity is ſo very ſmall, that it bears an extremely inconſiderable proportion to that of the earth it is intended to manure.

The fermenting quality of dung is chiefly owing to the ſalts it contains, and yet thoſe or any other ſalts, applied immediately to the roots of plants, always deſtroy them. This proves that the buſineſs of the dung is not to nouriſh but to divide and ſeparate that terreſtrial matter, which is to afford the nouriſhment to vegetables, through the mouths of their roots: and the acrimony of the ſalts of dung is ſo great, that the niceſt managers of vegetables we have, (the floriſts) have wholly baniſhed the uſe of it from their gardens. The uſe of dung ſhould alſo be forbid in kitchen-gardens, for it is poſſible to ſucceed full as well without it; and it gives an ill taſte to all the excellent roots and plants that are to ſtand in the earth in which it is an ingredient. The water of a cabbage raiſed in a garden manured with dung, if boiled, is of an intolerable ſtink; but this is not ſo much owing to the nature of the plant, as of the manure uſed to it; for a field cabbage being boiled, the water has ſcarce any ſmell, and what it has is not diſagreeable.

It is alſo a well known fact in the country, that a carrot raiſed in a garden, has nothing of that ſweet flavour which ſuch as grow in the fields have; but, in the place of this natural reliſh, the garden one has a compound taſte, in which the matter of the manure has no ſmall ſhare: and there is the ſame ſort of difference in the taſte of roots, nouriſhed with ſuch different diet. Dung not only ſpoils the flavour of the eſculent vegetable, but it ſpoils the drinkables into the original compoſition of which it enters: they are obliged to uſe dung to the poor vineyards of Languedoc, and the conſequence is, that the wine is nauſeous. The poor who only raiſe a few vines for the wine they drink themſelves, and cannot be at the expence of this manure, have the leſs of it, but then it is better by many degrees than the other; and it is a general obſervation, which the French expreſs in theſe words, that the poor people's wine in Languedoc is the beſt, becauſe they carry no dung into their vineyards.

Another diſadvantage attending the uſe of dung is, that it gives riſe to worms. It is for this reaſon, that garden carrots are generally worm-eaten, and field carrots ſound; and the ſame obſervation will hold good in other vegetables, in the field and in the garden. Vegetable and animal dung are in fact only the putrefaction of earth, after it has been altered by paſſing through vegetable or animal veſſels. Vegetable dung, unleſs the vegetable be buried alive in the ſoil, makes a much leſs ferment in it than animal dung does: but the dung or putrid matter of vegetables is much more eligible and wholeſome for the eſculent roots and plants than that of animals is. Venomous animals are found to be very fond of dung, and are brought into gardens by the ſmell of the dung uſed in them as manure. The ſnakes uſually frequent dung-hills, and lay their eggs in them; and gardens where dung is much uſed, are always frequented by toads; whereas the fields where roots are planted are much leſs infected by them.

However unneceſſary and prejudicial dung is in gardens, it is however very neceſſary in the corn-fields, and little can be done without it in the old method of huſbandry. Dung is not ſo injurious in fields as in gardens; becauſe it is uſed in much ſmaller quantities in proportion to the quantity of ſoil, and cabbages, turnips, potatoes, and other things growing in fields, and intended only for the food of cattle, will not be injured by dung, tillage, and hoeing all together; for the crops will by this means be the greater, and the cattle will like the food never the worſe. Dung is very beneficial in giving large crops of wheat; and it is found by experience, that the country farmers, at a diſtance from a large town, can never have ſo good crops by all their tillage, as thoſe who live in the neighbourhood of cities, where dung is produced in great plenty, and eaſily had. The dung uſed in fields, beſides its diſſolving and dividing virtue, is of great uſe in the warmth its fermenting gives to the young plants of the corn in their weakeſt ſtate, and in the moſt ſevere ſeaſons; the laſting of this ferment is not eaſily determined, becauſe the degrees of heat are very difficult to be judged of, when they become ſmall.

The farmers uſually underſtand by the term dung, not only the excrements of animals, with the litter, but every thing that will ferment with the earth, ſuch as the green ſtalks and leaves of plants buried under ground, and the like, and every thing they add to it except fire.

The uſes of the dung of ſeveral animals are ſufficiently proved every day. They are uſed to repair the decays of exhauſted and worn-out land, and to cure the ſeveral defects in different naturally bad ſoils; the faults of which are as different, as the nature of the different dungs uſed to improve them. Some land is too cold, moiſt, and heavy, and the other too light and dry: and, to improve and meliorate theſe, we have ſome dung hot and light, as ſheep's, horſes, pigeons, &c. and other fat and cooling, as that of oxen, dogs, &c.

There are two remarkable qualities in dung; the one is to produce a certain ſenſible heat, capable of bringing about great effects: the other is to fatten the ſoil, and render it the more fertile. The firſt of theſe is ſeldom found in any other dung but that of horſes and mules, while newly made, and a little moiſt: the great effects of this are ſeen in the kitchen garden, where it invigorates and gives a new life to every thing, ſupplying the place of the ſun; and to this we owe, in a manner, all the vegetable delicacies of the ſpring.

Beſide this, horſe-dung is the richeſt of all improvements that can be had in any quantity for poor hungry lands; yet, when either too new, or when uſed alone, it is very prejudicial to ſome lands; and, if ſpread too thin on dry lands in ſummer, it becomes of very little ſervice, the ſun ſoon exhaling all its richneſs, and leaving it little more than a heap of ſtubble or dry thatch: and, though too much of it can hardly be uſed in the kitchen-garden among colliflowers, cabbages, and the like; yet it is eaſy to over-dung land intended for corn, and gives riſe by that means to a very fatal quantity of weeds.

Horſe-dung is always beſt for cold lands, and cow-dung for hot ones; but being mixed together, they make a very good manure for moſt ſorts of ſoils, and for ſome they are very properly mixed with mud.

Sheep's-dung and deer's-dung differ very little in their quality, and are eſteemed by ſome the beſt of all dung for cold clays; for this purpoſe ſome recommend the beating them to powder, and ſpreading them thin over the autumn or ſpring crops, at about four or five loads to an acre, after the ſame manner as aſhes, malt duſt, &c. are ſtrewed: and in Flanders, and ſome other places, they houſe their ſheep at night in places ſpread with clean ſand, laid about five or ſix inches thick, which, being laid on freſh every night, is cleaned out once a week, and, with the dung and urine of the ſheep, is a very rich manure, and ſells at a very conſiderable price. It is principally uſed for ſtubborn lands; but Mr. Quintiney is of opinion, that it is the beſt of all manure for lands in general.

Hog's-dung is by many recommended as the fatteſt and richeſt of all dung; and is found, on experience, to be better than any other kind, for fruit-trees, apples, pears, and the like; it is alſo a very rich dung for graſs; and is ſaid to do as much good in one load, as any other dung whatever in two.

The dungs of pigeons, hens, and geeſe, are great improvers of meadow and corn land. That of pigeons is unqueſtionably the richeſt that can be laid on corn land; but, before it is uſed, it ought to be expoſed for ſome time out of the dove-houſe to the open air, to take off its fiery heat. It is in general very proper for cold clay lands, but then it always ſhould be well dried before it is laid on, becauſe it is apt to clod in the wet. It is beſt alſo to mix it with ſome dry earth to break its parts, that it may be ſpread the more regularly; and it is in itſelf ſo very rich and hot, as to bear ſuch an admixture, without greatly impoveriſhing it. This dung is alſo by ſome recommended as better than any other for aſparagus and ſtrawberries, and for the propagation and culture of the tender garden flowers. The dung of pigeons is alſo particularly recommended by Mr. Gentil for thoſe trees, whoſe leaves are apt to turn yellow, if they grow in cold ſoils; but for this uſe it ſhould firſt lie three years in a dung-hill, and then be applied ſparingly in autumn, laying about an inch thickneſs of it at the root of the tree, and ſuffering it to remain there till the March following.

The dung of poultry, being hot and full of ſalts, tends much to facilitate vegetation, and is abundantly quicker in its operation than the dung of animals, which feed on the leaves of plants. It is an obſervation of Sir Hugh Plat, that one load of grains will enrich ground, more than ten loads of common dung; and it is eaſy to infer from hence, that the ſame grain muſt needs be of greatly more virtue, when it has paſſed through an animal body. Human dung is alſo a great improver of all cold and ſour lands, but ſucceeds beſt when mixed with other dungs or earths to give it a fermentation.

But for all ſtubborn clayey ſoils, there is no manure ſo good as the cleanſing of London ſtreets; the parts of tough land will be more expeditiouſly ſeparated by this, than by any other compoſt; and, where it is to be had, it is of the greateſt value both for field and garden land.

DUNGEON, or Donjon, in fortification, is commonly a large tower or redoubt of a fortreſs, whither the garriſon may retreat, in caſe of neceſſity, and capitulate with greater advantage.

DUNG-MEERS, in huſbandry, places where ſoils and dungs are mixed and digeſted together: for this purpoſe it is uſual to dig a pit ſufficient to hold the ſtock of ſoil the huſbandman is capable of making; and to prepare it at the bottom with ſtone and clay, that it may hold water, or the moiſture of the dung; and beſides, it ſhould be ſo ſituated that the ſinks and drips of the houſes and barns may run into it. Into this pit they caſt refuſe fodder, litter, dung, weeds, &c. where they lie and rot together, till the farmer have occaſion for it.

DUO, or Duet, in muſic, a ſong or compoſition to be performed in two parts only; one ſung, and the other played on an inſtrument, or by two voices alone: it is alſo called a duo, when two voices ſing different parts, accompanied with a third, which is a thorough baſs. Uniſons and octaves muſt be rarely uſed in duo's, except at the beginning and end.

DUODENUM, in anatomy, the firſt of the ſmall inteſtines, ſo called becauſe it is about twelve fingers' breadth in length. It begins at the right orifice of the ſtomach, then turns towards the ſpine, and ends on the left ſide, where the circumvolutions begin. It is a kind of ſuccedaneous ſtomach; and performs the like functions, as appears from its internal ſtructure, which is the ſame with that of the ſtomach, for the glandulous villoſe coat, out of which there conſtantly diſtils a ſolvent juice in the ſtomach, is continued through the duodenum. Beſides this glandulous coat, the duodenum is furniſhed with innumerable ſmall glands, which, upon the ſeparation of the tunica villoſa, are very conſpicuous in the nervous coat, and which were firſt diſcovered by the famous Brunnerus. Beſides, it has alſo ſome peculiar and remarkable ducts, which diſcharge into its cavity a highly active menſtruum: for the bilious juice runs in a leſs quantity from the gall bladder, but in a larger from the liver and its biliary ducts. In like manner the duct emerging from the pancreatic gland, which is remarkably large, conveys into it a great quantity of lymph of a ſolvent nature: and it is farther obſervable, that theſe two ducts run together in a human body, and their orifices end in a papilla, and are directly placed over the bottom of the flexure of the duodenum, that the liquids conveyed by theſe ducts might deſcend drop by drop on the ſubjacent maſs of chyle. We do not obſerve any lacteals in the duodenum, and conſequently there is no ſuch ſecretion made there, as in the other inteſtines, particularly the jejunum; and for this reaſon the meſentery does not reach to the duodenum, though all the other ſmall inteſtines adhere to it. It is very obſervable, that there is not any animal but what has this flexure of the inteſtine, or little ſuccedaneous ſtomach; and that no animal is without the bilious juice, which is generated in the liver, and poured copiouſly into the duodenum; which manifeſtly proves, that nature has exerted her utmoſt ſkill in faſhioning this part of the body, ſo neceſſary for the preſervation of the life and health of animals.

DUPLE *Ratio*, in mathematics, is when any number or quantity contains another twice, as 6 is in a duple ratio to 3.

Sub-Duple *Ratio*, in mathematics, is when any number or quantity is contained in another twice; thus 3 is ſaid to be ſub-duple to 6.

DUPLICATE *Ratio* is a ratio compounded of two ratios; as the duplicate ratio of a to b is the ratio of aa to bb, or the ſquare of a to the ſquare of b.

In a ſeries of geometrical proportionals, the firſt term to the third is ſaid to be a duplicate ratio of the firſt to the ſecond: Thus, in 2, 4, 8, 16, the ratio of 2 to 8 is duplicate of that of 2 to 4; ſo that duplicate ratio is the proportion of ſquares, as triplicate is of cubes, &c. and the ratio of 2 to 8 is ſaid to be compounded of that of 2 to 4, and of 4 to 8.

DUPLICATION is the doubling of any thing, or multiplying of it by 2: it is alſo the folding of any thing back again on itſelf.

Duplication *of the Cube* is to find the ſide of a cube that ſhall be double in ſolidity to a given cube, which is a famous problem cultivated by the geometricians theſe two thouſand years.

It was firſt propoſed by the oracle of Apollo at Delphos; which, being conſulted about the manner of ſtopping a plague then raging at Athens, returned for anſwer, that the plague ſhould ceaſe when Apollo's altar, which was cubical, ſhould be doubled. Upon this, they applied themſelves, in good earneſt, to ſeek the duplicature of the cube, which hence-forward was called the Delian problem.

The ſolution of this problem depends upon finding two mean proportionals between two given lines: for if the ſide of a given cube be $= a$, and the ſide of a double cube be $= y$, then will $2a^3 = y^3$; or putting $b = 2a$, it will be $aab = y^3$; therefore it will be $aa : yy :: y : b$; or, making $z = \frac{yy}{a}$, it will be $a : z :: y : b$; ſo that theſe four quantities will be continual proportionals: conſequently y, the ſide of the cube ſought, is the ſecond of two mean proportionals between a and b.

DUPLICATURE, among anatomiſts, is the doubling of any membranes, when they run off to ſome diſtance, and return again.

DUPONDIUS, in antiquity, the weight of two pounds; alſo a piece of money equal to two as's in value.

The word is derived from the Latin, *duo*, two, and *pondo*, a pound weight.

DURA Mater, in anatomy, one of the membranes, or meninges, as they are called, which ſurround the brain. See the article *Dura* Mater.

DURATION, an idea which we get by attending to the fleeting and perpetually periſhing part of ſucceſſion; the idea of ſucceſſion being acquired by reflecting on that train of ideas which conſtantly follow one another in our minds, as long as we are awake. The ſimple modes of duration are any different lengths of it whereof we have diſtinct ideas, as hours, days, years, time, eternity, &c.

Duration, as marked by certain periods and meaſures, is what we moſt properly call time. See the article Time.

Duration *of Action*, according to Ariſtotle, is confined to a natural day in tragedy; but the epopea, according to the ſame critic, has no fixed time.

DUTCHY, in geography, an appellation given to the dominions of a duke. See the article Duke.

Dutchy-Court, a court of the dutchy-chamber of Lancaſter, held at Weſtminſter, before the chancellor of the ſame, for matters concerning the lands and franchiſes of that dutchy.

DUTY, in general, denotes any thing that one is obliged to perform.

Duty, in polity and commerce, ſignifies the impoſt laid on merchandizes, at importation or exportation, commonly called the duties of cuſtoms; alſo the taxes of exciſe, ſtamp-duties, &c.

Duty, in the military art, is the exerciſe of thoſe functions that belong to a ſoldier.

DUUMVIRATE, the office or dignity of the duumviri.

The duumvirate laſted till the year of Rome 388, when it was changed into decemvirate.

DWAL, in heraldry, the herb night-ſhade uſed by ſuch as blazon with flowers and herbs, inſtead of metals and colours, for ſable or black.

DYE, in architecture, any ſquare body, as the trunk, or notched part of a pedeſtal: or it is the middle of the pedeſtal, or that part included between the baſe and the corniche, ſo called becauſe it is often made in the form of a cube or dye.

DYEING, the art of giving a laſting colour to ſilks, cloths, and other ſubſtances, whereby their beauty is much improved, and value enhanced.

Ingredients uſed in dyeing. Theſe are beſt reduced under two heads: colorata, or thoſe which properly give the colour: and non-colorata, uſed to prepare the ſtuffs for better taking the dye, and to heighten the luſtre of the colours.

The colouring ingredients are of three ſorts, blue, yellow, and red. To the firſt ſort belong indigo, woad, weld, wood-wax, and log-wood; to the ſecond, fuſtic; to the third, madder, brazil, cochineal, kermes, ſafflower, and ſanders. To which may be added annotto, and young fuſtic, for orange-colours: laſtly, wood-ſoot.

The art of dyeing is indebted, for many of its valuable colours, to the vegetable kingdom; and may be much more ſo, if the world will be at the pains of enquiring into the properties of the plants that grow about the fields. Mr. Juſſieu obſerved, in the drying plants between ſheets of paper, in order to the making a hortus ſiccus in the common way, that ſome plants tinged the papers with colours the ſame with thoſe they naturally poſſeſs, and others with different ones; and that many plants in drying aſſumed a colour which was not natural to them. Alkanet, woad, the ſeveral ſorts of gallium, and ſome of the ſpecies anonis, tinge the papers between which they are dried to a yellowiſh or reddiſh colour, becauſe their ſtalks, or ſome other parts of them, are of that colour. The common ros ſolis, or ſun-dew, whoſe leaves are red, tinges the paper red alſo; and the ros ſolis of Portugal diffuſes this tinge through three or four ſheets of paper. The Alpine veronica, though green in itſelf, leaves its mark in red upon the paper; and many of the common leguminous plants always become black in the drying. The common mercury, which is green, while growing, becomes blue in the drying; and turnſole has the ſame change, though it is white in its natural ſtate.

One great reaſon of theſe changes of colour is, that all paper is impregnated with alum; and this ſalt may very eaſily extract, or even alter the colours of plants, whoſe juices it receives; and in ſuch caſes, where the alum is not in ſufficient quantity to do this, it is no wonder that it ſhould however ſo far affect the leaves as to turn them black.

On this principle, Mr. Juſſieu attempted, by means of alum, to ſeparate colours from ſeveral plants, not known or uſed at preſent among the dyers, which might prove ſerviceable to them. The fiſt experiment made on this occaſion proved, that there were many plants not uſed at preſent, which afford colours not at all inferior to thoſe in common uſe. The experiments the ſame gentleman tried on the drugs uſed for dyeing in the Indies, proved very plainly that they were no way ſuperior in many caſes to vegetables of our own growth; and that, in order to have the moſt lively colours from ſuch ſubſtances, it is always neceſſary to have recourſe to ſome ſalt.

Among the other drugs uſed abroad in dyeing, there were ſent over to France, on this occaſion, certain yellow flowers of the radiated kind, which afforded on trial a very beautiful yellow dye; and Mr. Juſſieu found, on trying parallel experiments, that there were alſo yellow flowers in Europe of a like radiated kind, which were capable of affording a like beautiful yellow dye.

The flower which Mr. Juſſieu tried theſe experiments upon, was the common yellow corn marygold, the chryſanthemum ſegetum of Lobel. This plant flowers in the middle of July, and Mr. Juſſieu, drying its flowers between papers at that time of the year, found that they did not loſe their colour, as moſt others do in the operation, but became of a deeper yellow than before. Hence it was eaſy to judge, that this flower contained a matter proper for colouring; and, decoctions being made of it of different ſtrength, cloths of different kinds dipped into them became tinged to a light pale yellow, and kept this colour after being boiled in fair water. A little alum was after this added to the decoctions, and cloths dipped in theſe became much more finely dyed, the colour being greatly ſtronger and more lively. They alſo imbibed the colour much more ſpeedily from the decoctions; and, on boiling afterwards in water, they loſt no part of it, but remained as ſtrongly and as lively tinged as before. This experiment was afterwards tried by a dyer, under whoſe hands it ſucceeded much better than before with Juſſieu, who was unacquainted with the regular methods of the trade. The decoctions of the flowers gave a ſort of ſulphur colour; but linen, woollen, and ſilken things, which had been the day before ſteeped in alum water, received from this decoction a very beautiful and ſufficiently ſtrong yellow. Another decoction of the flowers, made ſtronger than the firſt, tinged a woollen cloth of a greeniſh lemon-colour; and the ſame decoction gave a bright gold-yellow to ſilk: and a piece of woollen cloth, before dyed blue with indigo, on dipping it in this decoction, became of a beautiful deep-green. A ſmall quantity of chimney ſoot added to the decoction made it tinge cloth of a yellowiſh-brown, and a ſmall quantity of roucou added to the ſimple decoction produced an olive-yellow.

The mixture of ſeveral other drugs, uſed to be added to the decoctions of the common luteola or dyer's weed to vary its tinge, produced the ſame changes with the decoction of this flower, and abundantly teſtified its value and uſe in the dyeing trade. *Mem. Acad. Par.* 1724.

There is therefore great reaſon to believe, that the art of dyeing might be carried to much greater perfection than it is at preſent, if the attempts to improve it were in proper hands, and the perſons employed in it could be enabled to ſet out with all the knowledge there is at preſent in regard to its ſeveral materials, and their manner of uſe, as a fund of real facts on which to ground future diſcoveries. This however ſeems too difficult to be brought about; for the people who exerciſe the art generally are acquainted only with a certain ſet of rules, which tho' they know not the reaſon of they follow, will not depart from them, and eſteem every thing loſs of time that can be propoſed to them as improvements. They keep their knowledge alſo a cloſe ſecret from thoſe who might be expected to improve upon it; and uſually, one man trades only in ſome one part of it, without any knowledge of the reſt. Hence the difficulties attending the acquiring a knowledge of the firſt principles of the art are very diſcouraging, but they are not unſurmountable. The idea which preſents itſelf moſt naturally to us, as to the manner in which ſtuffs are dyed, is, that the colouring particles which ſwim in the liquor, immediately attach themſelves to the ſurface of the body that is plunged into it, and there adhere in ſo firm a manner, that there is no removing many of them without wholly taking off the ſurface of the body. The barely plunging a white ſubſtance into a coloured liquor is not however ſufficient for the dyeing of it in many caſes. Indeed, there are only a few colours which will ſtrike with this eaſe and facility; and the others require that the matter to be dyed ſhould have firſt received the particles of another fluid, which is in moſt caſes a ſolution of alum and tartar in common water: and, according to the nature of the colour that is to be given the ſtuff afterwards, the alum is put in large quantities, or the ſtuff boiled in the liquor a longer or a ſhorter time. After boiling in this liquor, the ſtuff is in the proper condition to receive the greater part of the common colours; but, for blue, ſtuffs require no preparation at all; and, for ſcarlet, the liquor in which they are firſt boiled is made without alum.

The matter of the ſtuff to be dyed makes it neceſſary alſo to change the liquor in which it is boiled, or to vary the ingredients; and the greateſt naturaliſts, without a mechanical knowledge of dyeing, would be amazed to ſee, that if a ſkain of white wool, and another of white cotton, be plunged together into the ſcarlet dye, and this even after they have both received the ſame previous boiling and preparation, the ſkain of cotton would come out of the liquor as white as it was put in, while the wool comes out tinged of a beautiful fire-colour. The dyer however ſees this every day without an admiration of the cauſe, and never troubling his thoughts about how it is done. He uſes it daily, to dye any thing woollen to a ſcarlet-colour, leaving a part white: in order to which, he knows, there requires no more than that the part to be left white, ſhould be of cotton.

Mr. du Fay, ſuppoſing this to be owing to the cotton's imbibing, much more ſlowly than the wool, the liquor in which they are both previouſly boiled to make them receive the colour, as cotton is well known not to take wet ſo ſoon as wool, ordered a ſort of cloth to be wove, the warp of which was wool, and the woof cotton; and, ſending this to the fuller's, the two ſubſtances were ſo well blended together, that it became impoſſible for the one to receive the impregnation of any liquor without the other. With all theſe precautions however, the whole came out of the ſcarlet dye in the ſame condition as if nothing had been done, the cotton remaining wholly white, and the wool being marked with fire-colour and white; ſo that it may be eſteemed a certain fact, that the colour of cochineal cannot be given to cotton by the means of acids; the ſame alſo holds good of kermes and gum-lac, both which are uſed inſtead of cochineal to dye in ſcarlet; but neither of theſe, any more than the cochineal, will dye cotton. It is not to be concluded from hence, however, that cotton cannot be dyed ſcarlet by other ſubſtances; the truth is, that it requires a different treatment; and as wool, to take the ſcarlet dye, requires only to be firſt impregnated with tartar, cotton requires to be firſt impregnated with alum, as wool does, for the generality of other colours. The acid of ſea-ſalt, of vitriol, vinegar, and verjuice, all ſerve to dye wool to a ſcarlet with cochineal, but none of theſe will make it give any tinge to cotton, though alum alone will ſerve.

The ſame dye will give very different colours to the different parts of a cloth, which have been differently prepared. And this gentleman ſhewed before the Academy a piece of cloth, which he had carefully prepared in a different manner in the different parts, which being all plunged together into the dye, when taken out and dried, was found to be of a dirty red in that part where it had not been impregnated with any thing; and in the other parts, where it had been differently impregnated, was found of all the degrees of red, from a pale damaſk roſe-colour to the deepeſt ſcarlet, and this, while it had in every part been dipped an equal time in the ſame dye. This equally holds good of the other colours: and, in theſe experiments, the dirty colours given to ſuch parts of the cloth as have received no previous impregnation, will be waſhed away, and quite carried off, while the others remain in all their perfection.

Another circumſtance very worthy attention in the dyeing of ſcarlet is this, that the dye is evidently compoſed of a clear or common water, in which the colouring particles are ſuſpended, and from which it is eaſy to ſuppoſe that they are ſeparated and applied to the ſtuff in dyeing. As this is naturally ſuppoſed to be the caſe in regard to all colours, ſo it appears very evidently to be a fact in this, ſince the colouring particles adhere in ſuch quantities to the matter, and ſeparate themſelves ſo readily and perfectly from the water, that after an hour and half's boiling of the dye with the proper quantity of the ſtuff in it, the whole coloured matter ſhall be attached to the ſtuff, and the remaining liquor be only clear water; and what might appear wonderful is, that all the boiling in the world will never diſlodge any of the colour from the ſtuff, or occaſion its being received into the water again.

It might be ſuppoſed that this was wholly owing to the particles of ſalts, which had been imbibed into the ſtuff in its prior preparation; that theſe attracting the particles of the colour to the ſtuff, while the water of the dye had none of them to cauſe ſuch an attraction in the fluid, they did not remain in it. But this appears not to be the caſe, but that the ſtuff will attract the colour, whether it be previouſly prepared, or the preparation and the dyeing be all one act; ſince the dyers ſometimes dye ſcarlet at once in this manner, only plunging the ſtuff into a dye made of cochineal, a ſolution of tin mixed in a large quantity of water, with a ſmall quantity of ſal armoniac and cream of tartar. All theſe ingredients are mixed together before the ſtuff is put in, yet, after it has boiled about an hour and half, all the colour is in the ſtuff, and the liquor is become colourleſs as water. The event is the ſame in the dyes made of woad and of indigo for the dyeing blue, and indeed in the greater part of other colours; but as the ingredients of theſe are not ſo pure as the cochineal, and there are uſually many heterogeneous particles among them, the liquor does not become ſo wholly colourleſs in theſe, as in the caſe of the ſcarlet: but the dyers, who well know that ſo long as there is any colour left in the liquor, ſo long the ſtuff will be profited by remaining in it, always take ſmall quantities out of it, and, examining it by pouring it gently down againſt the light, they know when it is that the ſtuff has received all the tincture it can, by there being no more colouring matter ſuſpended in the dye.

Experience ſhews, that all colours do not attach themſelves with equal readineſs to the ſtuff, or remain equally firmly united to it. Woad, indigo, cochineal, kermes, and many other colours, never reach farther than the ſurface of the ſtuff. The liquor of the dye penetrates indeed perfectly through the body of it, but the colouring particles ſtopping at the ſurface become entangled there, and never penetrate, at leaſt not in any great quantity, to the central part, which remains either quite white, or only very ſlightly tinged. This however only happens to ſuch ſtuffs as are thick, and of a very cloſe texture: others are coloured throughout. And this is only the caſe in regard to ſome dyes, not to all ſorts, ſince moſt of the wood-colours penetrate wholly through the ſtuff, be it ever ſo thick, and colour it equally every where. Whence it ſeems probable, that the colouring particles of the woods are either more minute and fine, or much more intimately blended with the water, than thoſe of cochineal, indigo, and ſuch others as do not penetrate beyond the ſurface.

It might ſeem ſtrange, that the ſtuffs which are thus readily coloured on the ſurface, ſhould not afterwards, by the continued boiling of the water, have the colouring particles carried farther down into the body, as the water continually penetrates the whole from each ſurface to the center, and might naturally be expected to carry a part of the colouring particles in along with it. But, if we conſider the whole proceſs from the beginning, we find that the colouring particles are ſtrongly attracted by the ſtuff, and ſcarce at all by the water. Whence they almoſt immediately leave the water, and attach themſelves to the firſt part of the ſtuff they come in contact with, which is its ſurface; and, when once fixed there, it is no wonder that the particles of water, ever ſo long paſſing by them, do not attract or take them away from this ſurface, as they muſt do in order to carry them in; ſince we have before had proof, that their attraction to the water is greatly weaker than that to the ſtuff. And the difference between the wool and the cotton, the one receiving, and the other not receiving at all the coloured particles in its natural ſtate, or with the ſame impregnation by means of which the other does, ſeems reſolvible into the ſame principle, that though the attraction in wool be much greater in regard to the coloured particles than that of the water, and therefore it robs the water of them; yet the attraction in cotton being leſs than in water, the colouring particles remain in the water without any tendency to attach themſelves to the cotton.

In dyeing, the ingredients uſed for the colours are well known to be of very different kinds. Some of them are ſuch as communicate a colour, which will a long time reſiſt the injuries of the air, and theſe are therefore called the good or ſtanding colours; and there are others which the bare expoſition to the air will deſtroy or deface in a very little time; theſe are therefore called the falſe or fading colours. In what manner is the action of the air upon theſe laſt to be explained? Does it take away, or carry off from the ſtuſt the very particles of the colours; or does it only break and deſtroy that beautiful and regular texture of each particle on which the colour depends? The dyers very often have recourſe to ſeveral ingredients, in order to procure one colour; and reaſon ſeems to urge, that one of theſe falſe or fading colours might be rendered laſting by mixing it with a permanent one: the dyers are alſo of this opinion. But it is nevertheleſs an erroneous one; for repeated experiments have proved, that one of theſe falſe colours fades as ſoon, when it is mixed with a ſtanding or laſting colour, as when it is uſed alone. There are but few colours on which this experiment can be tried, ſo as to come to a regular deciſion. One of the principal is the mixing a blue and a yellow, for the producing a green. In this experiment, if the blue and the yellow be both ſtanding or permanent colours, the ſtuff will perfectly hold its colours, and ſucceed alike, whether it be dyed firſt blue, and afterwards yellow; or firſt yellow, and afterwards blue. But, if one of the two colours be a falſe or fading colour, it is found that the green produced by the mixture will not ſtand, though the other be ever ſo good or permanent a colour.

There is a ſhorter way of trying the permanence of many colours of this kind, than that of expoſing them to the air, ſince in boiling only five minutes in a pint of water, in which there has been diſſolved half an ounce of alum, they will loſe as much colour as they would have done by being expoſed two days to the air in ſummer. Some colours require different methods of trial, but this ſerves for almoſt all. The ſhades of blue, yellow, red and green, purple and green, are the fineſt colours to make theſe experiments upon, as the ſame previous preparation or impregnation of the ſtuff ſerves for both, and both depend upon blue for their baſis, the purple being made of blue and red, and the green of blue and yellow.

It ſhould not ſeem ſurpriſing, if the ſtuff be firſt dipped into a dye of a ſtanding blue, and afterwards into a fading red or yellow, to turn it green or purple, that the action of the air, or boiling in alum water, ſhould carry off thoſe falſe colours, which had only been applied to the ſtuff, after it was before ſaturated with a ſtanding colour. But it might be expected, that when the ſtuff was firſt impregnated with them, and afterwards had the blue added upon them, that either the blue muſt be the colour that went off, or that they muſt all remain: but, in effect, nothing of this difference is found, but the blue remains, while the fading colours go off, however, or in whatever manner or order, they are applied. *Mem. Acad. Scienc. Par.* 1737.

The non-colouring ingredients are,—Certain reſtringent or binding materials, as galls, ſumac, alder,bark, pomegranate peel, walnut rinds and roots, ſapling bark, and crab-tree bark.—Certain ſalts, as alum, argol, ſalt-petre, ſal armoniac, pot-aſhes, lime, and urine.—Liquors, as well-water, river-water, aqua-vitæ, vinegar, lemon-juice, aqua-fortis, honey, and melaſſes.—Gums, as tragacanth, arabic, maſtic, and ſanguis draconis.—Smectics, or abſterſives, as ſoap, fullers-earth, linſeed-oil, ox-gall, &c.—Metals, as ſteel-filings, tin, ſlippe, and pewter, to which add copperas, verdigriſe, antimony, litharge, and arſenic.—Laſtly, bran, wheat-flower, yolks of eggs, leaven, cummin-ſeed, fenugreek-ſeed, argaric, and ſenna.

Of moſt of the ingredients ſome account may be found under their reſpective articles in the courſe of this work; but, with regard to their uſe and effect in dyeing, it will be neceſſary to conſider them more particularly, and to bring them together in one view.

Among the non-colouring drugs from the mineral kingdom, come, 1. Copperas, ſteel-filings, and ſlippe, the ſtuff found in the troughs of old grind-ſtones, whereon edge tools have been ground, which are uſed for all true or Spaniſh blacks, though not for the Flanders blacks. 2. Pewter diſſolved in aqua-fortis, is uſed for the new ſcarlet or bow-dye. 3. Litharge, though not owned or allowed, is uſed to add weight to the dyed ſilks. 4. Antimony uſed chiefly for the ſame purpoſe; though it alſo contains a tingent ſulphur, which by precipitation, &c. affords a great variety of colours. 5. Arſenic uſed in dyeing crimſon, on pretence of giving a luſtre. 6. Verdigriſe, uſed by linen-dyers, in their yellow and green-colours. 7. Alum. 8. Bran and bran-water, whoſe flour, entering the pores of the ſtuff, levigates its ſurface, and thus renders the colour laid on it more beautiful; much as woods, to be gilded, are firſt ſmoothed over with white colours. 9. Salt-petre, uſed chiefly in aqua-fortis, in the bow-dye, to brighten colours by back boiling; for which purpoſe, 10. Argol is more commonly uſed. 11. Lime or chalk, uſed in the working of blue vats.

Non-colouring ingredients of the animal kind are, 1. Honey. 2. Yolks of eggs. 3. Ox-gall: though this, and the two laſt, are only uſed by a few particular dyers to ſcower, promote fermentation, and increaſe weight. 4. Stale urine, uſed as a lixivium to ſcower, alſo to help the fermenting and heating of woad; though it is alſo uſed in the blue vats inſtead of lime: in reality, as it diſcharges the yellow, wherewith blue and moſt greens are compounded, it is uſed to ſpend weld withal: yet it is known that the urine or old mud of piſſing-places will dye a well ſcowered piece of ſilver of a golden colour; it being with this, not Bath water as imagined, that the Bath ſixpences, &c. are prepared.

To the claſs of non-colouring ingredients, may alſo be added water, by dyers called white-liquor, which is of two ſorts. 1. Spring water uſed in reds, and other colours wanting reſtringency, as well as in dyeing ſtuffs of a looſe contexture, as calico, fuſtian, and the ſeveral ſpecies of cottons: but naught for blues, and making yellows and greens look ruſty. 2. River-water, ſofter and ſweeter than the former, and diſſolving ſoap better, uſed in moſt caſes by the dyers, for waſhing, rinſing, &c. their cloths after dyeing. 3. Liquor, abſolutely ſo called, which is bran-liquor, made of one part bran, and five of river-water, boiled an hour, and put in a leaden ciſtern to ſettle: four or five days in ſummer will turn it too ſour, and unfit for uſe: its office is to contribute to the holding of the colour. It is known that ſtarch, which is only the flour of bran, makes a clinging paſte, which will conglutinate paper, though not wood or metals. Accordingly, bran-liquors are uſed to thicken dyeing ſtuffs; thus madder is rendered clammy and glutinous by being boiled in bran-water, and thus made to ſtick better to the villi of the ſtuff dyed. 4. Gums, tragacanth, arabic, maſtich, and ſanguis draconis, are uſed in dyeing ſilk, chiefly to give it a gloſſineſs, which may make it ſeem finer, as well as ſtiffer, and to increaſe its weight.

For the colouring ingredients, coloranthia colorata, we have, 1. Iron and ſteel, or what is made from them, which we have obſerved are uſed in dyeing blacks; though how they contribute thereto is not ſo obvious: we know that green oaken boards become black, by the friction of the ſaw; a green ſour apple, cut with a knife, turns of the ſame colour; the white greaſe, wherewith the wheels of coaches are anointed, becomes likewiſe black, by means of the iron boxes wherewith the nave is lined, and the friction between the nave and the axle-tree; and that an oaken ſtick becomes black by a violent friction againſt other wood in a turning lathe; and the black colour on earthen-ware is given with ſcalings of iron vitrefied. From all which it ſeems to follow, that the buſineſs of blacking lies in the iron, and particularly in its uſtulation or friction. Be this as it will, copperas, the moſt uſeful ingredient for dyeing black, is the ſalt of the pyrites wherewith old iron is incorporated: and, wherever this is uſed, ſome of the aſtringents are to accompany it. 2. Red-wood chopped, and ground in a mill, is uſed for dyeing cloth, rugs, &c. of the coarſer ſort. Its tincture, which is a ſort of brick-colour, is got out by long boiling it in galls, and the cloth along with it. It ſtands better than brazil. 3. Brazil, chopped alſo, and ground, dyes a pink colour, or carnation, neareſt approaching cochineal: it is uſed with alum;

with pot-aſhes it alſo ſerves for purples. It eaſily ſtains. 4. Madder gives a colour near approaching the bow-dye, or new ſcarlet: thoſe called baſtard ſcarlets are dyed with it. It endures much boiling, and is uſed both with alum and argol, and holds well: the brighteſt dyes with madder are made by over-dyeing the ſtuff, and then diſcharging part of it by back boiling in argol. It is uſed with bran-water inſtead of white liquor. 5. Cochineal, uſed with bran-liquor in a pewter furnace, with aqua-fortis, gives the dye called among us, tho' improperly, ſcarlet in grain. Any acid takes off the intenſe redneſs of this colour, and turns it towards an orange, or flame-colour. With this colour the Spaniſh leather and wool, uſed by ladies, are dyed. 6. Annotto gives an orange-colour, eſpecially to ſilks, linens, and cottons; for it does not penetrate cloth: it is uſed with pot-aſhes. 7. Weld, by the help of pot-aſhes, yields a deep lemon colour, though it is uſed to give all ſorts of yellows. 8. Wood-wax, a green wood, called alſo geniſta tinctoria, and the dyers-weed, has the like effect as weld, though its uſe is chiefly confined to coarſe cloths. It is ſet with pot-aſhes, or urine. 9. Fuſtic is of two ſorts, young and old: the former, chopped and ground, yields a kind of reddiſh orange colour; the latter a colour diſtant ſeveral degrees of yellow from the former. It ſpends with or without ſalts, works either hot or cold, and holds firm. 10. Wood-ſoot, containing not only a colour, but a ſalt, needs nothing to extract its dye, or make it ſtrike on the ſtuff. The natural colour it yields is that of honey; but it is the foundation of many other colours on wool, and cloth only. 11. Woad ground, or bruiſed with a mill for the purpoſe, is made up into balls, which being broken, and ſtrewed on lime or urine, is uſed with pot-aſhes, or ſea-weed, and gives a laſting blue. The lime, or calk, accelerates the fermentation of the woad, which in three or four days will work like a guile of beer, and be covered with a greeniſh froth or flower. An intenſe woad colour is almoſt black, that is, is of a damſon-colour. It is the foundation of ſo many colours, in its different degrees or ſhades, that the dyers have a ſcale whereby to compute the lightneſs and depth of this colour. 12. Indigo is of the like nature, and uſed for the ſame purpoſe as woad, only it is ſtronger. 13. Log-wood, chopped and ground, yields a purpliſh-blue: it may be uſed with alum: formerly it was of ill repute, as a moſt falſe and fading colour; but ſince it has been uſed with galls, it is leſs complained of. The dyeing materials are generally applied in decoctions made in water, more or leſs ſtrong, according to the occaſion; ſometimes by only dipping the ſtuff in the vat of dye; ſometimes by boiling it therein; and ſometimes by leaving it a day or more to ſteep For the alum, in dyeing ſilks, is always applied cold, in which ſtate alone it contributes to the brightneſs of the dye.

The art of dyeing may be divided into as many branches as there are different colours to be communicated, and ſorts of different ſtuffs to be ſubjects of it.

Dyeing of cloths, ſerges, druggets, and other woollen manufactures. For black, in cloths and ſtuffs of price, it is begun with a ſtrong decoction of woad and indigo, which give a deep blue; after which, the ſtuffs, being boiled with alum and tartar, or pot-aſhes, are to be maddered with common madder; then dyed black with Aleppo galls, copperas, and ſumac; and finiſhed by back boiling in weld. Scarlet is dyed with kermes and cochineal, with which may alſo be uſed agaric and arſenic. Crimſon-ſcarlet is given with cochineal-meſtich, aqua-fortis, ſal armoniac, ſublimate, and ſpirit of wine. Violet, ſcarlet, purple, amaranth, and panſy-ſcarlet, are given with woad, cochineal, indigo. braziletto, brazil, and orchal. For common reds, pure madder is uſed, without other ingredients. Crimſon-reds, carnations, flame and peach-colours, are dyed, according to their ſeveral hues, with cochineal-meſtich, without madder, or the like. Crimſon red is prepared with Roman alum, and finiſhed with cochineal. Peach-colour muſt be back boiled a little with galls and copperas, or the like. Orange aurora or golden yellow, brick colour, and onion-peel colour, are given with woad and madder, tempered according to their reſpective ſhades. For blues, the dark are given with ſtrong tincture of woad: the brighter with the ſame liquor, as it weakens in working. Dark browns, minims, and tan-colours, are given with woad, weaker in decoction than for black, with alum and pot-aſhes; after which, they are maddered higher than black: for tan-colours, a little cochineal is added. Pearl-colours are given with galls and copperas; ſome are begun with walnut-tree roots, and finiſhed with the former; though, to make them more ſerviceable, they dip them in a weak tincture of cochineal. Greens are begun with woad, and finiſhed with weld. Pale-yellows, lemon-colours, and ſulphur-colours, are given with weld only. Olive-colours of all degrees are firſt put in green, and taken down again with ſoot, more or leſs, according to the ſhade required. Feulemort, hair-colour, muſk, and cinnamon-colour, are given with weld and madder. Nacarat, or bright orange-red, is given with weld and goats hair, boiled with pot-aſhes. Fuſtic here is forbid, as a falſe colour.

Dyeing *of Wools for Tapeſtry* is performed after the ſame manner as cloths, excepting blacks, which are only to be woaded, and then put in black as above.

Black wools for cloths and ſerges may be begun with walnut-tree root, and walnut rinds, and finiſhed by dipping in a vat of black.

Dyeing *of Silks* is begun by boiling them with ſope, &c. then ſcowering and waſhing them out in the river, and ſteeping them in alum-water cold. For crimſon they ſcour them a ſecond time before putting them in the cochineal vat.

Red-crimſon is dyed with pure cochineal meſtich, adding galls, turmeric, arſenic, and tartar, all put together in a copper of fair water almoſt boiling: with theſe the ſilk is to be boiled an hour and a half; after which, it is ſuffered to ſtand in the liquor till next day. Violet-crimſon is alſo given with pure cochineal, arſenic, tartar, and galls; but the galls in leſs proportion than in the former: when taken out, it is to be well waſhed, and put in a vat of indigo. Cinnamon-crimſon is begun like the violet, but finiſhed by back-boiling, if too bright, with copperas; if dark, with a dip in indigo. Light-blues are given in a vat of indigo. Sky-blues are begun with orchal, and finiſhed with indigo: for citron-colours, the ſilk is firſt alumed, then welded, with a little indigo. Pale-yellows, after aluming, are dyed in weld alone. Pale and brown auroras, after aluming, are welded ſtrongly, then taken down with rocou diſſolved with pot-aſhes. Flame-colour is begun with rocou, then alumed, and dipped in a vat or two of brazil. Carnation, and roſe-colours, are firſt alumed, then dipped in brazil. Cinnamon-colour, after aluming, is dipped in brazil and braziletto. Lead-colour is given with fuſtic, or with weld, braziletto, galls, and copperas. But the galls, on theſe and other occaſions, are not to be uſed, becauſe they increaſe the weight to the damage of the purchaſer; for which reaſon, it is puniſhed in France as a fraud: in reality, few but black ſilks need galls.

Black ſilks, of the coarſer ſort, are begun by ſcowering them with ſoap, as for other colours; which done, they are waſhed out, wrung, and boiled an hour in old galls, where they are left to ſtand a day or two; after which they are waſhed again with fair water, wrung, and put in another vat of new and fine galls; then waſhed and wrung again, and finiſhed in a vat of black. Fine black ſilks are only put once into galls, viz. the new and fine ſort, which has only boiled an hour; then they are waſhed, and wrung out, and dipped thrice in black, to be afterwards brought down by back-boiling with ſoap.

Dyeing *of Thread* is begun with ſcowering it in lye of good aſhes; after which it is wrung, rinſed out in river-water, and wrung again. For a bright-blue, it is given with braziletto and indigo. Bright-green is firſt dyed blue, then back-boiled with braziletto and verdeter, and laſtly woaded. For a dark-green it is given like the former, only darkened more before woading. Lemon, or pale yellow, is given with weld, mixed with rocou. Orange and iſabella, with fuſtic, weld, and rocou. Red, both bright and dark, with flame colour, &c. are given with brazil, either alone, or with a mixture of rocou. Violet, dry roſe, and amaranth, are given with brazil, taken down with indigo. Feulemort, and olive-colour, are given with galls and copperas, taken down with weld, rocou, or fuſtic. Black is given with galls and copperas, taken down and finiſhed with braziletto wood.

DYEING *of Hats* is done with braziletto, galls, copperas, verdigreaſe, diſſolved and boiled in a copper capable of receiving, beſides the liquor, twelve dozen of hats on their blocks, or moulds. Here the hats are ſuffered to boil ſome time; after which, they are taken out, and ſuffered to ſtand and cool; then dipped again; and thus alternately, oftener or ſeldomer, as the ſtuff is of a nature to take the dye with more or leſs difficulty.

Proof of DYES.—There are divers ways of proving the truth of dyes, or examining the juſtneſs and legitimacy of their compoſition. To diſcover whether a cloth have been duly treated by the dyer, and the proper foundation laid, a white ſpot, by the French called roſette, of the bigneſs of a ſhilling, ought to be left; beſides a white ſtripe between the cloth and the liſt.

Farther proof is had by boiling the dyed ſtuff in water, with other ingredients different according to the quality of the dye to be proved. If the colour ſuſtain the teſt, i. e. do not diſcharge at all, or very little, ſo that the water is not tinctured by it, the dye is pronounced good: otherwiſe, falſe.

Proof of the DYES *of Silks.*—For red crimſon the proof is made by boiling the ſilk with an equal weight of alum. For ſcarlet-crimſon, it is boiled with ſoap almoſt of the weight of the ſilk. For violet-crimſon, with alum of equal weight with the ſilk, or with citron-juice, about a pint to a pound of ſilk. Theſe ingredients are to be mixed, and put in fair water, when it begins to boil; after which, the ſilks are alſo to be put in, and after boiling the whole for half a quarter of an hour, if the dye be falſe, the liquor or the red-crimſon will be violet, in caſe it had been dyed with orchal, or very red, if with brazil. That of crimſon-ſcarlet, if rocou have been uſed, will become of an aurora colour, or, if brazil have been uſed, red. And that of violet-crimſon, if brazil or orchal have been uſed, will be of a colour bordering on red. On the contrary, if the three ſorts of crimſon be truly dyed, their liquors will diſcover very little alteration.

A ſtill ſurer way to diſcover whether crimſon ſilks have been rightly dyed, is by boiling a piece of ſtandard dyed crimſon ſilk, kept for that purpoſe at Dyers-Hall, after the ſame manner, and then comparing the tinctures of the two liquors.

To diſcover whether other colours have been dyed with galls, the ſilk is put in fair boiling water, with pot-aſhes, or ſoap, nearly of the weight of the ſilk; after ſome time it is taken out; upon which, if it have been dyed with galls, the colour will be all vaniſhed, and nothing but that of the galls left, which is a ſort of feulemort, or wood colour.

The dyeing of ſilk with galls may alſo be detected by putting it in boiling water, with a gallon of citron juice; being taken out, and waſhed in cold water, and then dipped in a black dye, if galls have been uſed, it will turn black; if not, it will be of a brown-bread colour.

To diſcover whether black ſilk have been overdoſed with galls, ſteel-filings, or ſlippe, it is boiled in fair water, with twice its weight of ſoap: if it be loaden with galls, it will turn reddiſh, otherwiſe it will keep its colour.

To diſcover whether black cloth have been firſt woaded, and maddered; a ſample of it, and, at the ſame time, a ſample of ſtandard black, kept for that purpoſe by the Dyers company, is to be taken; and then as much Roman alum as is equal in weight to both, together with a like weight of pot-aſhes, is to be put over the fire in a pan of bran water: when it begins to boil, the two ſamples to be put in, and after half an hour to be taken out and compared. The piece which has only been woaded will be found bluiſh, with ſomewhat of a dull green; if it have been both woaded and maddered, it will be of a tan or minim colour; and if it have been neither woaded nor maddered, its colour will be dunniſh, between yellow and fallow.

For cloths dyed of a minim colour, the proof is to be made after the ſame manner as that of blacks.

To know whether ſcarlet or crimſon cloth have been dyed with pure cochineal, they are to be boiled with an ounce of alum to a pound of cloth.

For cloths of other colours, the proof is to be made in the ſame manner as that of blacks and minims.

Theory of DYEING.—We cannot better cloſe this article than with ſome general deductions, which may throw a little neceſſary light on the theory of dyeing. As, 1. That all the materials, which of themſelves give colour, are either red, yellow, or blue; ſo that out of them, and the primitive fundamental colour, white, all that great variety, which we ſee in dyed ſtuffs, ariſes. 2. That few of the colouring materials (as cochineal, ſoot, wood-wax, or woad) are, in their outward and firſt appearance, of the ſame colour, which, by the ſlighteſt ſolutions in the weakeſt menſtrua, they dye upon cloth, ſilk, &c. 3. That many of the colouring materials will not yield their colours without much grinding, ſteeping, boiling, fermenting, or corroſion by powerful menſtrua; as red-wood, weld, woad, annotto, &c. 4. That many of the ſaid colouring materials will of themſelves give no colouring at all, as copperas, or galls, or with much diſadvantage, unleſs the cloth, or other ſtuff to be dyed, be firſt covered or incruſtated, as it were, with ſome other matter, tho' colourleſs, aforehand; as madder, weld, and brazil, with alum. 5. That ſome of the colouring materials, by the help of other colourleſs ones, ſtrike different colours from what they would alone, and of themſelves; as cochineal and brazil. 6. That ſome colours, as madder, indigo, and woad, by reiterated tinctures, will at laſt become black. 7. That though green be the moſt frequent and common of natural colours, yet there is no ſimple ingredient, which is now uſed alone, to dye green with upon any material; ſap-green, the condenſed juice of the rhamnus berry, being the neareſt; and this only uſed by country people. 8. There is no black thing in uſe which dyes black; though both the coal and ſoot of moſt things burnt, or ſcorched, be of that colour; and the blacker, by how much the matter, before it was burnt, was whiter, as in the famous inſtance of ivory black. 9. The tincture of ſome dyeing ſtuffs will fade even with lying, or with the air, or will ſtain even with water; but very much with wine, vinegar, urine, &c. 10. Some of the dyers materials are uſed to bind and ſtrengthen a colour; ſome to brighten it; ſome to give luſtre to the ſtuff; ſome to diſcharge and take off the colour, either in whole, or in part; and ſome, out of fraud, to make the material dyed, if coſtly, to be heavier. 11. Some dyeing ingredients, or drugs, by the coarſeneſs of their bodies, make the thread of the dyed ſtuff ſeem coarſer; and ſome, by ſhrinking them, ſmaller; and ſome, by levigating their aſperities, finer. 12. Many of the ſame colours are dyed upon different ſtuffs with different materials; as red-wood uſed in cloth, not in ſilks; annotto in ſilks, not in cloth; ſo that they may be dyed at ſeveral prices. 13. Scowering, and waſhing of ſtuffs to be dyed, is to be done with appropriate materials; as ſometimes with ox-galls, ſometimes with fullers earth, ſometimes with ſoap; this latter being pernicious in ſome caſes, where pot-aſhes will ſtain or alter the colour. 14. Where great quantities of ſtuffs are to be dyed together, or where they are to be done with great ſpeed, and where the pieces are very long, broad, thick, &c. they are to be differently handled, both in reſpect to the veſſels and ingredients. 15. In ſome colours and ſtuffs the tingent liquor muſt be boiling; in other caſes bloodwarm, in ſome it may be cold. 16. Some tingent liquors are fitted for uſe by long keeping; and in ſome the virtue wears away by the ſame. 17. Some colours, or ſtuffs, are beſt dyed by reiterated dippings over into the ſame liquor at ſeveral intervals of time, and ſome by continuing longer, and others leſſer whiles therein. 18. In ſome caſes, the matter of the veſſel wherein the liquors are heated, and the tinctures prepared, muſt be regarded; as that the kettles be pewter for bow-dye. 19. Little regard is had how much liquor is uſed in proportion to the dyeing drugs; the liquor being adjuſted to the bulk of the ſtuff, as the veſſels are to the breadth of the ſame; the quantity of dyeing being proportioned to the colour higher or lower, and to the ſtuffs both; as likewiſe the ſalts are to the dyeing drugs.

Concerning the weight which colours give to ſilks, for in them it is moſt taken notice of, as being ſold by weight, and being a commodity of great price; it is obſerved that one pound of raw ſilk loſes four ounces by waſhing out the gums and natural ſordes. That the ſame ſcowered ſilk may be raiſed to above thirty ounces from the remaining twelve, if it be dyed black, with certain materials. That the reaſon why black colour may be dyed heavieſt is, that all ponderous drugs may be dyed black, being all of colours lighter than it; whereas there ſeem to be few or no materials wherewith to increaſe the weight of ſilk, which will conſiſt of fair light colours; and perhaps white arſenic to carnations is the only inſtance.

Of things uſeful in dyeing, eſpecially black, nothing increaſes weight ſo much as galls; by means whereof black ſilks recover the weight which they loſt by waſhing out their gum: nor is it counted extraordinary, that blacks ſhould gain about four or ſix ounces in the dyeing upon each pound. Next to galls, old fuſtic increaſes the weight about one half in twelve. Madder about an ounce. Weld half an ounce. The blue vat, in deep blues of the fifth ſtall, adds no conſiderable weight. Neither does logwood, cochineal, or annotto; nor even copperas of itſelf, where galls are not. Slippe adds much to the weight, and gives a deeper black than copperas, which affords a good excuſe for dyers that uſe it.

Dyeing *of Leather, Skins, &c.*—Blue is given by ſteeping the ſubject a day in urine and indigo, then boiling it with alum: or it may be given by tempering the indigo with red-wine, and waſhing the ſkins therewith. Red is given by waſhing the ſkins, and laying them two hours in galls, then wringing them out, dipping them in a liquor made with liguſtrum, alum, and verdigriſe in water; and laſtly, in a dye made of brazil wood, boiled with ley. Purple is given by wetting the ſkins with a ſolution of roche alum in warm water, and, when dry again, rubbing them with the hand with a decoction of log-wood in colder. Green is given by ſmeering the ſkin with ſap-green and alum water boiled: to darken the colour, a little more indigo may be added. Dark-green is alſo given with ſteel filings and ſal armoniac ſteeped in urine till ſoft, then ſmeered over the ſkin; which is to be dried in the ſhade. Sky-colour is given with indigo ſteeped in boiling water, and the next morning warmed and ſmeered over the ſkin. Yellow, by ſmeering the ſkin over with aloes and linſeed-oil diſſolved and ſtrained: or by infuſing it in weld. Orange-colour is given by ſmeering with fuſtic berries boiled in alum water: or, for a deep orange, with turmeric.

Dyeing, or Staining, *of Wood for inlaying, vaneering, &c.*—Red is done by boiling the wood in water and alum; then taking it out, adding brazil to the liquor, and giving the wood another boil in it. Black, by bruſhing it over with log-wood boiled in vinegar, hot; then waſhing it over with a decoction of galls and copperas, till it be of the hue required. Any other colour may be given by ſqueezing out the moiſture of horſe-dung thro' a ſieve, mixing it with diſſolved roche alum and gum-arabic; and to the whole adding green, blue, or any other colour deſigned: after ſtanding two or three days, pear-tree, or other wood, cut to the thickneſs of half a crown, is put into the liquor boiling hot, and ſuffered to remain till it be ſufficiently coloured.

Dyeing *of Bone, Horn, or Ivory.*—Black is performed by ſteeping braſs in aqua-fortis till it be returned green: with this the bone, &c. is to be waſhed once or twice; then put in a warmed decoction of log-wood and water. Green is begun by boiling the bone, &c. in alum-water; then with verdigriſe, ſal ammoniac, and white wine vinegar; keeping it hot therein till ſufficiently green. Red is begun by boiling it in alum-water, and finiſhed by decoction in a liquor compounded of quick-lime ſteeped in rain-water, ſtrained, and to every pint an ounce of brazil-wood added. In this decoction the bone, &c. is to be boiled till ſufficiently red.

Dyeing, or Staining, *Horn to imitate Tortoiſe-Shell.*—The horn to be dyed muſt be firſt preſſed into proper plates, ſcales, or other flat form; and the following mixture prepared.

"Take of quick-lime two parts, and of litharge one part; temper them together to the conſiſtence of a ſoft paſte with ſoap-lye." Put this paſte over all the parts of the horn, except ſuch as are proper to be left tranſparent, in order to give it a nearer reſemblance of the tortoiſe-ſhell. The horn muſt remain in this manner covered with the paſte till it be thoroughly dry; when the paſte being bruſhed off, the horn will be found partly opaque and partly tranſparent, in the manner of tortoiſe-ſhell; and when put over a ſoil, of the kind of latten, called aſſidue, will be ſcarcely diſtinguiſhable from it. It requires ſome degree of fancy and judgment to diſpoſe of the paſte in ſuch a manner as to form a variety of tranſparent parts, of different magnitudes and figures, to look like the effect of nature; and it will be an improvement to add ſemi-tranſparent parts: which may be done by mixing whiting with ſome of the paſte to weaken its operation in particular places; by which ſpots of a reddiſh brown will be produced, which, if properly interſperſed, eſpecially on the edges of the dark parts, will greatly increaſe both the beauty of the work, and its ſimilitude with the real tortoiſe-ſhell.

Dyeing, or Staining, *Paper or Parchment yellow.*—Paper may be ſtained yellow by the tincture of French berries, prepared by boiling them in water with a little alum: but a much more beautiful yellow may be obtained by uſing the tincture of turmeric, formed by infuſing an ounce or more of the root, powdered, in a pint of ſpirit of wine. This may be made to give any teint of yellow, from the lighteſt ſtraw to the full colour called French yellow; and will equal in brightneſs the beſt dyed ſilks. If yellow be wanted of a warmer or redder caſt, annotto, or dragon's-blood, muſt be added to the tincture.

The beſt method of uſing theſe, and the following tinctures, is to ſpread them even on the paper or parchment by means of a broad bruſh in the manner uſed in varniſhing.

Dyeing, or Staining, *Paper, or Parchment, red.*—Paper or parchment may be ſtained red with the common red ink. It may be ſtained of a ſcarlet hue by tincture of dragon's-blood in ſpirit of wine; but this will not be bright.

A very fine crimſon ſtain may be given to paper, by a tincture of the Indian lake; which may be made by infuſing the lake ſome days in ſpirit of wine; and then pouring off the tincture from the dregs.

Dyeing, or Staining, *Paper, or Parchment, green.*—Paper, or parchment, may be ſtained green by a ſolution of verdigriſe in vinegar; or by the cryſtals of verdigriſe diſſolved in water. As alſo by the ſolution of copper in aqua-fortis, made by adding filings of copper gradually to the aqua-fortis, till no ebullition enſues; or ſpirit of ſalt may be uſed in the place of aqua-fortis.

Dyeing, or Staining, *Paper, or Parchment, blue.*—A blue colour may be given to paper or parchment by ſtaining it green by any of the above methods, and then bruſhing it over with a ſolution of pearl aſhes. It may alſo be done by a ſolution of indigo procured at the dyers.

Dyeing, or Staining, *Paper, or Parchment, orange.*—Stain the paper or parchment of a full yellow, by means of the tincture of turmeric as above directed; then bruſh it over with a ſolution of fixed alkaline ſalt, made by diſſolving half an ounce of pearl-aſhes, or ſalt of tartar, in a quart of water, and filtering the ſolution.

Dyeing, or Staining, *Paper, or Parchment, purple.*—Paper or parchment may be ſtained purple by orchal; or by a tincture of log-wood. The juice of ripe privet-berries, expreſſed, will alſo give a purple dye to paper or parchment.

DYKE, or Dike. See the article Dike.

DYNASTY, among ancient hiſtorians, ſignifies a race or ſucceſſion of kings of the ſame line or family: ſuch were the dynaſties of Egypt.

DYSCRACY, among phyſicians, denotes an ill habit or ſtate of the humours, as in the ſcurvy, jaundice, &c.

DYSENTERY, in medicine, an exulceration of the inteſtines, attended in the beginning with an excretion of a biting, bilious humour, afterwards with abraſions of the inteſtines, and, at laſt, blood in moderate quantities is voided.

The word is derived from the Greek, δυς, importing difficulty, and εντερα, the inteſtines.

When this diſeaſe is attended with a bloody flux and ſevere gripes, the inteſtines are commonly ulcerated, and diſcharge blood; which comes away, ſometimes with liquid excrements, ſometimes with ſlime accompanied with fleſhy particles. The patient is ſeized with frequent irritations to ſtool, and a pain of the anus; he diſcharges but little at a time, and his pain is increaſed by every ſtool; and as this diſeaſe ariſes from an inflammation, there is always ſome degree of fever with it.

Wherefore, to come to a cure, the firſt thing to be done is to draw blood: then a vomit to be given, for which ipecacuanha wine is very proper, and to be repeated two or three times every third or fourth day.

During this courſe, and afterward, medicines proper for ſtopping the flux and healing the ulcerated membranes are to be adminiſtered: and of this ſort I know none better than the following bolus, compoſed of the cordial confection and French bole, each one ſcruple; Thebaic extract, one grain, given three times a day.

And it will be of ſervice to inject clyſters, either of fat broth with the addition of Venice-treacle or electuary of ſcordium, or of the white decoction and ſtarch; or, in place of this laſt, of the chalk julep, with two or three grains of the Thebaic extract, when occaſion requires it. Laſtly, I recommend an uſeful remark, that this courſe is ſometimes rendered ineffectual by a bad habit of body. In ſuch caſes, to the foregoing method it will be proper to add medicines which correct the humours; and indeed ſome doſes of the rhubarb, with a ſmall proportion of dulcified mercury ſublimate, commonly called calomel, will prove very conducive to that end.

Beſides theſe diſeaſes, a vomica, or internal ſuppuration, is ſometimes formed in the ſtomach. This indeed ſeldom happens, but yet I have obſerved it more than once, when the patient vomited up a mixture of blood and purulent matter in large quantities.

The caſe is terrifying indeed; but yet, generally ſpeaking, it is not attended with any great danger; and it is cured by medicines which heal the ulcerated membranes, eſpecially Locatelli's balſam. *Mead's Monita et Præcepta.*

We ſhall here add a very remarkable caſe of this kind, as publiſhed by Dr. Grainger, in the ſecond volume of a work printed at Edinburgh, entitled, *Eſſays and Obſervations, Phyſical and Literary.*

"—— Arſdale, a ſtout, middle aged, but intemperate ſoldier, was ſeized November 1751, with ſhivering and other ſymptoms that precede an acute diſorder. The day following he went frequently to ſtool, and evacuated blood to the quantity of a gill every quarter of an hour: though the fever was inconſiderable, yet, as he was of a ſanguine habit, the lancet was not ſpared. He ſwallowed ſome ipecacuan vomits; was gently purged every third day with rhubarb; and had ſmall quantities of opium at bed-time to hinder his riſing in the night. The third week his fundament came down, attended with but little pain, unleſs when he went to ſtool: this ſymptom, however, was timeouſly removed by fomentations of a decoction of oak-bark. December; his ſtools, though leſs frequent, were mixed with blood and mucus: then the gripes ſeized him in good earneſt, ſometimes fixed and torturing like a ſtitch in the baſtard ribs, at other times wandering with barborygmi, now as it were twiſting his guts, then cutting him in two, as he expreſſed it, and bending him forward. They were always moſt ſevere before ſtool, eaſier in the time of evacuation, but eaſieſt after. With theſe ſymptoms were complicated a dyſury and piles, greatly inflamed, but bleeding none. Theſe diſmal complaints continued almoſt equally violent for three months, although V. S. emetics, vitr. antimon. cerat. mild antiphlogiſtic purgatives, opiates, lubricating and aſtringent remedies were uſed, as the ſymptoms indicated. Opiates, though they eaſed him, ſeldom procured undiſturbed repoſe, and always affected his head; this conſequence of laud. was more effectually prevented by balſ. locatel. than any thing elſe. Vomits always relieved him, but increaſed the pain of the hæmorroids Aſtringents, though they bound him up for a little time, moſt generally brought on afterwards a more frequent inclination to ſtool, with increaſed tormina. Clyſters were impracticable on account of the piles, but he found conſiderable ſervice from the milder purgatives, with calomel. and when the ſwelling of his fundament was removed by ſulphur and emollient, diſcutient applications, they became highly uſeful. In the fourth month, the region of the ſtomach ſwelled, with redneſs of his face, eſpecially after food, and continued for ſix months, although its removal was attempted by bitters; and the bark, (cautiouſly combined with purgatives) mulled claret, and camomile tea, while proper external applications were not forgotten. April and May, the hæmorroids and dyſury left him; but his ſtools became thinner, more acrid, and intolerably fetid: then he was ſeized with a hiccup, his face looked ghaſtly, his extremities turned cold, his pulſe became quick, ſmall, irregular, and his gripes were rather abated. Evacuations in theſe deplorable circumſtances were improper, but ſinapiſms were applied to the ſoles of his feet; and epiſpaſtics to the region of the ſtomach with ſome ſucceſs. A bolus of bark, caſtor, and camphire, was given every third hour, and waſhed down with a glaſs of mulled claret; his guts too were fomented with anodyne, emollient, and antiſeptic clyſters. By theſe his deadly ſymptoms left him; he could ſit up at the fire, and had not above twelve ſtools in the twenty-four hours, which were however ſtill ichorous. I could not find from the nurſe that he ever paſſed any of the villous coat of the guts, though ſcybala were frequently evacuated. About the end of May he was able to walk round the ramparts of Fort-William; and he told he thought he would recover, were he ſent from Lochaber. On this he was carried, by water, to the Iſle of Mull, being provided with proper medicines to forward his recovery. Here, though the hiccup and facies hippocratica did not recur, yet his gripes did; and he purged blood and worms almoſt inceſſantly. The latter end of July he was ſent back to the Fort a perfect ſkeleton; where, though I am convinced the air is inferior to that of Caſtle-Dowart in Mull; yet, as great care was taken both of his diet and medicines, he paſſed no more worms, his gripes only ſeized him at ſtool, whither he went much more ſeldom than formerly; what he paſſed now appeared to be mucus, mixed with pus and ſtreaks of blood. Very ſmall doſes of ipececuan. viz. eight grains three times a day were then adminiſtered to him every third day; but though they relieved by operating both up and down, yet they ſickened him ſo much, that I was obliged to ſubſtitute a bolus of calomel, over night, and a purging ptiſan next morning, in their place. The diſeaſe, however, did not yield; and when the regiment was ordered to march for Berwick-upon-Tweed, he was put aboard the veſſel that carried our baggage. This was a hardy ſtep, conſidering his weakneſs, and the length and danger of the voyage; but he could not be carried with his comrades over the Black mountain, and he deſired to die any where, rather than remain in Fort-William. Five or ſix weeks after he landed at Berwick, his ſtools were more numerous, and ſtill very painful. Sometimes blood, ſometimes ſlime, ſometimes ichor, and once he paſſed a great quantity of hardened excrements, which relieved him of a dull pain of his left hypochondre; his legs too, at night, ſwelled and pitted to the touch, and his ſtomach was often inflated. Bitters, with ſteel, were preſcribed, and camomile tea drank for breakfaſt, while the utmoſt regard was had to diet; the vitr. antimon. was again tried, and alum poſſet recommended. The dyſentery baffled all our attempts; and now, deſpairing of his recovery, I ordered him to drink lime-water, with a third part milk, to the quantity of an Engliſh pint and a half every day: it was at the latter end of November 1752. In three days time, there was a ſenſible change to the better, his ſtools were leſs frequent, and his pains abated. Encouraged by this happy beginning, he was ordered to drink lib iii. of lime-water a-day. This, in three weeks, made him ſo coſtive, that I was obliged to clyſter him, and diminiſh the aq. calc. to the quantity firſt ordered. In ſix weeks from his taking this medicine, he was ſo thoroughly recovered, that he was diſmiſſed the hoſpital, and ſoon after marched to his company at Carliſle, where he ſtill enjoys perfect health. The diſorder was on him full fourteen months; and I have reaſon to think his recovery was chiefly owing to the lime-water, after the moſt celebrated antidyſenterics had been uſed in vain.

"The dyſentery is endemic at Maryburgh, near Fort-William, and commonly attended with procedentia ani, piles, dyſury, abdominal inflations, oidema's, and hiccup. Many of the ſoldiers died, eſpecially the more intemperate; between the twentieth and thirty-fifth day is the fatal period. Thoſe who died had mortifications of the great guts: it began with us about the latter end of October; autumn however is its uſual ſeaſon; it rages commonly two months, though many have it all the winter, and I always obſerved them worſt in rainy weather. It may be worth while to obſerve, that of late lime-water principally conduced to cure an officer of a dyſentery, while another was effectually cured of a weakneſs in the bladder, by the ſame remedy."

DYSOREXY, among phyſicians, denotes a want of appetite, proceeding from a weakly ſtomach. See APPETITE.

DYSPEPSY, in phyſic, a difficulty of digeſtion; or rather a depraved digeſtion, when the aliments in the ſtomach, for want of a due ſtrength in the digeſtive organs, follow their ſpontaneous tendency, and contract an alkaline or acid putrefaction.

The word is formed from the Greek, δυς, importing difficult, or bad, and πεπτω, to correct.

DYSPNOEA, in phyſic, a difficulty of breathing.

The word is derived from the Greek, δυς, difficulty, and πνεω, to breathe.

A difficulty of breathing may be cauſed by any thing that can affect any part of the thorax, particularly the heart, large arteries, and lungs, by crude tubercles, vomica's, polypuſes, and ſeveral other diſorders.

DYSURIA, in medicine, a difficulty of making urine, attended with a ſenſation of heat and pain.

The word is derived from the Greek, δυς, importing painful, and ουρον, urine.

This diſeaſe is diſtinguiſhed from a ſtrangury, as, in the latter, the urine is voided by only a drop, as it were, at a time, but, however, with pain; and from an iſchury, as in this diſorder, there is an almoſt total ſuppreſſion of urine.

DYTISCUS, water-beetle, in zoology, a genus of inſects of the order of the coleoptera, the antennæ of which are ſlender and ſetaceous, and their feet formed for ſwimming. See COLEOPTERA.

Authors enumerate a great many ſpecies of this animal, among which is the great water-beetle, the largeſt of all European beetles, being an inch and an half in length, and all over of a deep and ſomewhat gloſſy black.

END of the FIRST VOLUME.